MARCH 28, 1960

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

## How to Boost Your Manager Productivity

Delegation, right down to the lowest supervisory level, is one of the keys, stresses N. Harvey Collisson, president of Ormet Corp. He and other top level troubleshooters provide practical tips on how you and your managers can: 1. Pinpoint managerial shortcomings. 2. Set up better objectives. 3. Measure the manager's performance—Page 59.

## New Power Concepts Promise Changes In Metalworking Products, Markets

## Australia Woos Foreign Investors

## More Carbon, Vanadium Boost Wear Properties of Air Hardening Steel

## Bandsaws Join Spark Machining Team

## Everybody's Buying More Tin Plate

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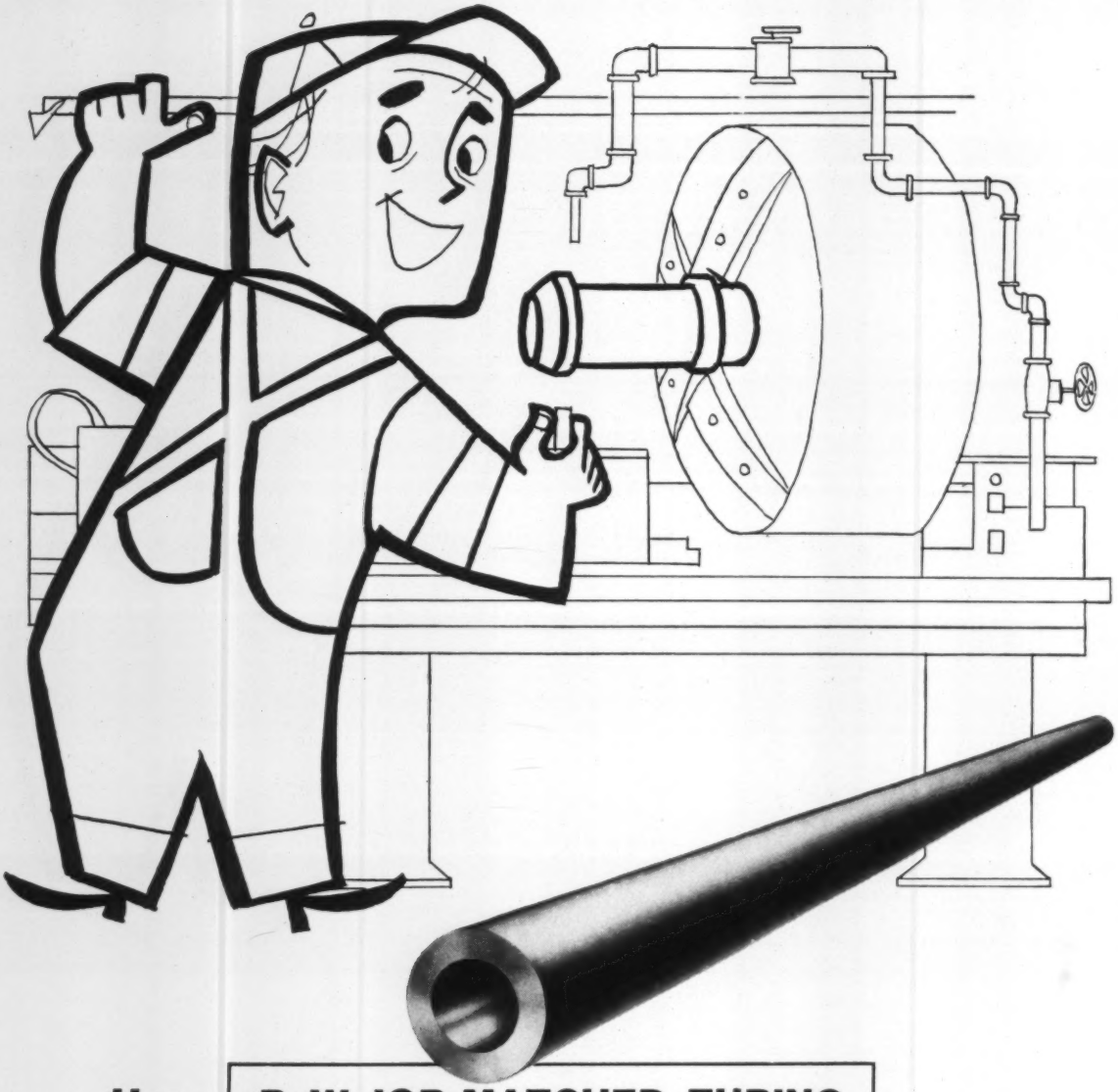
METALWORKING WEEK
PAGE 39



# How B&W JOB-MATCHED TUBING speeds machining of precision parts

. . . Uniform close tolerances—require minimum machining to "clean-up."

. . . Controlled metallurgical structures—provide optimum machinability.

. . . Complete size range—permits choice of a tube size most appropriate for end use.

These are just a few reasons why it pays to specify B&W Job-Matched Seamless Mechanical Tubing for production of hollow precision parts. Call your local B&W District Sales Office, or write for Bulletin TB-340 for full information. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

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Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

# This Week in STEEL
The Metalworking Weekly

March 28, 1960 Vol. 146 No. 13


## New Power Concepts Will Change Products, Markets

New sources of power generation, typified by this thermionic tube developed by Westinghouse Electric Corp., are already finding commercial applications. Westinghouse will introduce a thermoelectric home appliance this year. Space Age applications are sure to follow. The new ideas in power offer metalworkers:
New markets.
Longer lasting equipment.
New designs and processes.
More efficient power generation. PAGE 49

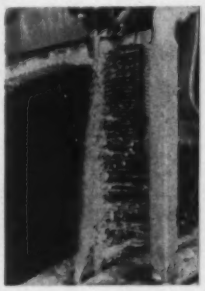
## Australia Woos Foreign Investors

Already a lively and growing market for U. S. capital, Australia is bidding for more foreign investment. About 800 manufacturers are allied with U. S. companies. You may want to check into the opportunities listed. PAGE 53

## More Carbon, Vanadium Boost Steel Wear Properties

Look for a wider useful range for the 5 per cent, chromium type, die steel developed by Braeburn Alloy Steel Corp., Braeburn, Pa. Increasing the carbon and vanadium content of the standard A-2 grade has resulted in improved wear resistance, higher hardness, and low distortion on air hardening. Here are new and improved applications. PAGE 84

## Bandsaws Join Spark Machining Team



Inspired by the spark machining concept, DoAll Co., Des Plaines, Ill., has modified its standard bandsawing machine to cut fragile structures with an electric arc. The process means that honeycomb structures can be cut through without costly setups, distortion to the part, or material waste. Fixtures retain the part to prevent deflection only; the cut is burrfree and requires no grinding. Loose allowances for cutting can be eliminated. Since saws are not subject to a cutting force, DoAll has developed some new types, including wire. PAGE 90

## Everybody's Buying More Tin Plate

Expect shipments of tin mill products this year to set a new record at 6.5 million tons, say leading producers. Behind the prediction: Another record production year for the industry's biggest customers, canmakers, who will add some major soft drink bottlers to growing can markets. Steelmakers are hoping to develop volume production of new, thin gage tin plate by late 1960 or early '61 for added market push. They're also sponsoring research on canned milk concentrate, another potential tin plate market. PAGE 113

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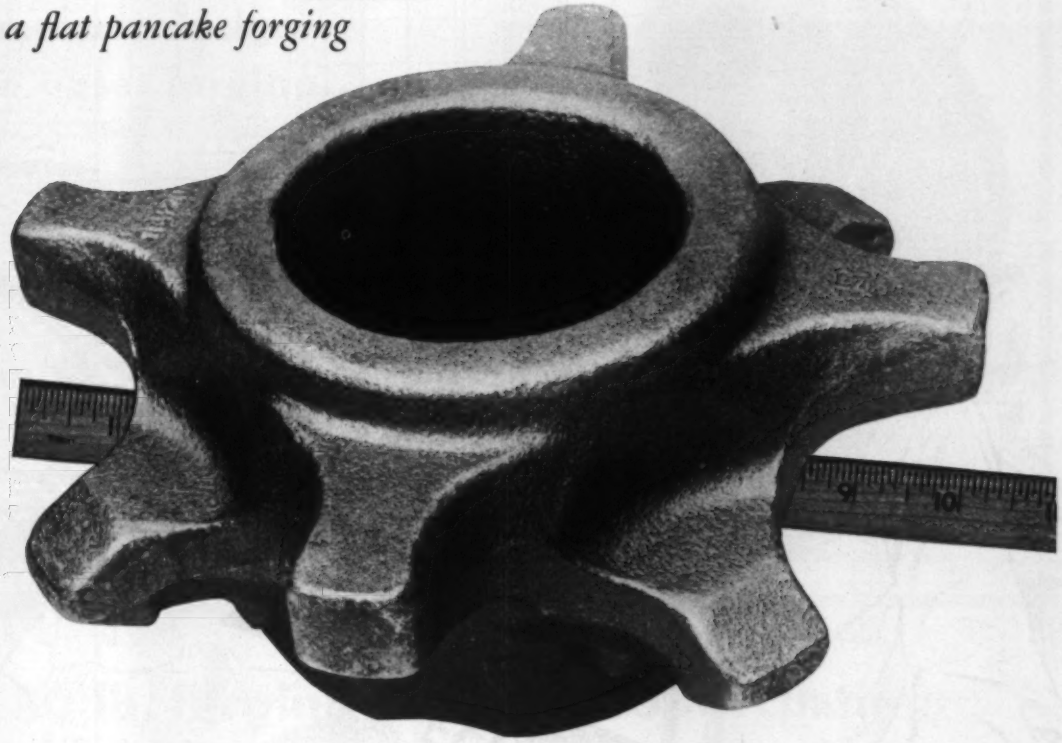
*This sprocket used to be machined from a flat pancake forging*



Now Bethlehem forges it as shown—
and reduces manufacturing cost
by $29 per piece!
This 27-lb forged sprocket costs less
than the flat pancake forging did.
Our customer not only saves
on the cost of the metal,
but almost all* the machining cost, too.
Perhaps we can do the same for you.
Call or write our nearest sales office.

*The only machining our customer does is finish the bore, and take light cuts on the outside tooth contour. Bethlehem can forge to the contour of sprocket teeth, if an as-forged surface is satisfactory.

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BETHLEHEM STEEL

# "Moto-Mower is Made of Only the Finest Materials . . . That's Why We Use Sharon Quality Blade Steels"

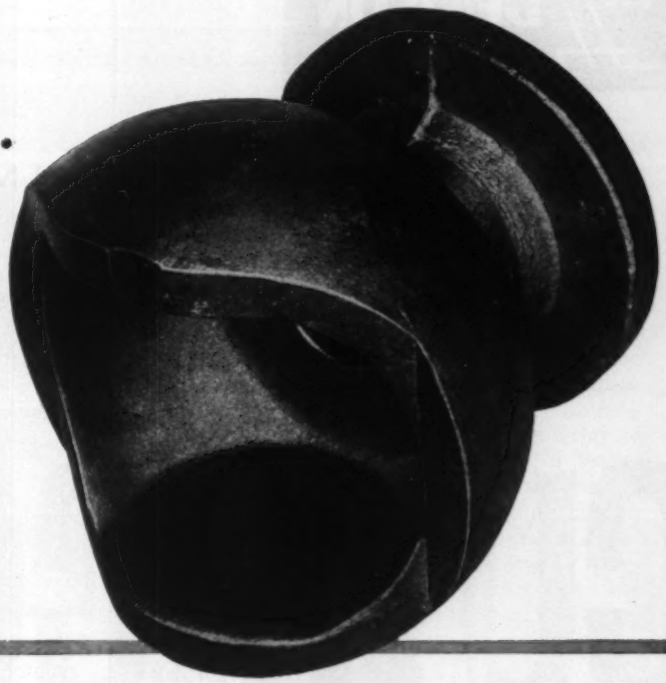
REUBEN SMITH, Inspector, MOTO-MOWER, Inc.
Subsidiary of DURA Corporation

"Here at Moto-Mower quality is not just a word . . . it's the goal," says Reuben Smith, Moto-Mower inspector. "To achieve this goal we have to be sure every component meets our rigid standards. I've found we can really depend on the quality cutting blade steels we get from the *Sharon Steel Corporation, Sharon, Pa.*"

SHARONSTEEL **SHARON** *Quality* **STEEL**

## unusual design in upset forging...

BALL-JOINT HOUSING for the steering and driving mechanism of the Clark Equipment Company's line of Four-Wheel Drive MICHIGAN End Loaders and Turbo-Dozers formerly produced as a steel casting is now turned out by Commercial as a closed-die forging on an 8-incl. upsetter.

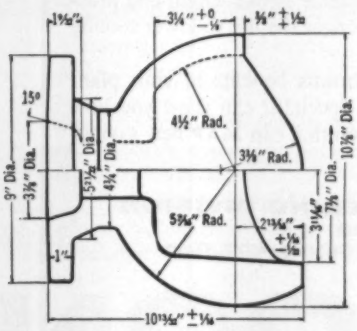


# 80 lb. forging replaces 95 lb. casting

A saving of 15 lbs. of metal on each housing component is only part of the impressive cost cutting story made possible at Clark Equipment Company by a switch to upset forgings.

When the parts were produced by Commercial as closed-die forgings on an 8-inch upsetter Clark Equipment reported:

1. An initial cost saving of 90¢ per part.
2. Closer tolerances for a 10% machining cost saving.
3. No rejects due to hidden metal defects.




**UNUSUAL SHAPE and characteristics notwithstanding — flanged on one end, belled on the other, and open on both ends—Commercial engineers proved this part could be produced as an upset forging with greater cost savings.**

Now, this important component not only costs Clark less per unit, but because of its controlled grain flow and efficient metal distribution it provides maximum tensile and torsional strength to resist unusual operating strains as well as massive and unpredictable shock and load. Longer operating life and trouble-free performance are assured.

And because forging impact and pressure produces a more dense, more uniform metal structure, forged parts absorb and dissipate heat at a uniform measurable degree. Obviously, that means elimination of distortion problems in heat treating. It also means fewer rejects during machining, since this dense uniform forged metal has no hidden internal flaws.

With new forging techniques continually unfolding to meet specific job requirements, more original equipment manufacturers are increasingly looking to upset forging to help solve their component forming problems—stronger, lighter, more compact parts at less cost per unit.

Many parts like this unusually shaped housing for Clark Equipment, which were formerly considered impossible to forge, are now routine at Commercial. An early check with Commercial's forging engineers on your particular component forming problem may pave the way for improvement in your product design and production methods—could save you time, money, and help improve performance and operating life.

### WHEN AN UPSET FORGING?

Check your part forming problems against this list of "bench marks" for parts requiring:

- Reduced weight, thinner section, greater strength.
- Consistent soundness — no losses due to porosity.
- Good appearance—smooth, close-grained surface.
- Superlative shock and fatigue resistance.
- Uniform response to heat treatment.
- Cost-cutting advantages in finishing—less waste metal, reduced machining, no rejects due to hidden flaws.

Address The Commercial Shearing and Stamping Company, Dept. L-14, Youngstown 1, Ohio.

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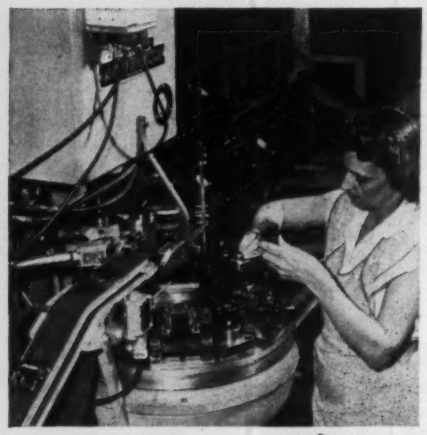
DENISON Multipress installation pays off for BARBER-COLMAN with faster, simplified small motor assembly that...

# CUTS COSTS



**DENISON 4-TON HYDRAULIC MULTIPRESS** *is used by Barber-Colman to assemble low-cost precision AC motors.*

**PREDICTED** cost cuts have been *confirmed* by the installation of three Denison Multipresses at Barber-Colman Company in Rockford, Illinois.

Justified by MAPI (Machinery and Allied Products Institute) formula analysis, these presses operate in a line connected by belt conveyors. Semi-automatically, Multipresses perform bending, staking, aligning, compressing, riveting and stamping operations in the production and assembly of small precision electric motors.

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# DENISON
## HYDRAULIC MULTIPRESS

Please direct all correspondence to attention of Ed Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

March 28, 1960

## The Motive Force

Here are three symbols, which in this age of motivation by symbols, are guaranteed to stir people to action. They are the tangible rewards in our Usership Idea of the Month Contest. In order of appearance—Top: A sack of nonferrous coins which represents the $1000 you can win in the contest. Really, we will pay you in paper currency or by check. That way you can use the money to light your favorite cigars (in case that's the way you like to light 'em). Middle: A wall plaque of stainless steel mounted on solid mahogany; a trophy that attests to perspicacity of top prize winners. Bottom: A desk lighter, handsomely etched, which can also be used to light your stogies (or your desk). Copies of this item will go to readers who receive honorable mentions. Contest rules follow:

## Have You Entered?

It's easy. Just tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—March, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Entries will be judged by a committee of STEEL editors. All letters become the property of STEEL Magazine. Please identify letters as Usership entries.

You can enter as many times as you wish. **Deadline for the March contest is May 1, 1960.** Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio.

P.S. Remember, the deadline for entries in our February contest is Apr. 1, 1960.

## What's Ahead?

That question has perplexed businessmen ever since Adam Smith began propounding classical economic theories. The question is even more perplexing in today's complex business world. You have told us you need more accurate information in the spring and fall—the times when you do most of your business planning.

To answer your needs, STEEL has obtained the services of 40 to 50 of the nation's top economists, commercial and market researchmen representing nearly all types of businesses. They are going to tell you, semiannually in the pages of STEEL, what you can expect for the next 12 months.

Next week, our panel of volunteer consultants will make its initial bow with opinions on a current issue and their predictions quarter by quarter for eight of the economic indicators you use most.

## Background Stuff

Bob Jaynes, editor of The Business Trend in STEEL, has been kicking this idea around since the economy started its recovery in the spring of 1959. In tracing the postwar business cycles, he noticed that most of the big swings came in spring and fall. But there was always a dearth of good forecast material at those times. (His desk was piled shoulder high with the stuff around Christmas each year.)

He's looking forward to the switch.

## Who Writes the Most?

"The average stationhouse police sergeant," says Paper Mate Co., "leaves 1600 ft of ink trails each workweek." Next in line are newspaper reporters, followed by college students, physicians, business executives, junior high school students, secretaries, sales people, insurance claim adjusters, and housewives.

## Catching Up with Our Mail

The editors are prone to believe that business executives should move up a notch or so in the above ratings. A deluge of letters has hit their offices.

## Pointing the Way

"We would like to reproduce your Feb. 1 article, 'Engineer Shortage Intensifies,' for distribution from our Careers in Engineering booth at the local Career-O-Rama, Mar. 30-Apr. 1," says J. Alfred Miller, chairman, Council of Engineering So-

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cieties, Winston-Salem, N. C. "About 14,000 junior and senior high school students will tour the exhibits . . ."

### Entropy Begets Action

"Please send me copies of your 1960 Program for Management articles," writes Don Busteed, general foreman, Bay State Abrasive Products Co., Westboro, Mass. "Your article on 'How to Diagnose Your Equipment Needs' was excellent. I never thought I would read about the word 'entropy' outside of a thermodynamics class."

The editors are busy notifying etymologists and lexicographers about the usage, Mr. Busteed.

### Reliability Revisited

"I would appreciate getting a copy of your Feb. 29 article, 'Reliability Concept Is Step Beyond Quality Control,'" writes M. B. Lindquist, manager-quality control, Small AC Motor & Generator Dept., General Electric Co., Schenectady, N. Y.

"Although I do not agree with everything the writer has stated in this article, I do think it is good. At General Electric, we believe reliability is an integral part of our total quality control concept . . . I was somewhat surprised to see a new name attached to a concept which was preached by GE as far back as 1946 . . ."

### On Target

More than once have the pages of STEEL provided ammunition for verbal volleys fired in the halls of Congress. Seldom, however, has it been used in salvos such as those delivered by Willard F. Rockwell, chairman, Rockwell Mfg. Co., Pittsburgh, when he spoke before the House Foreign Affairs Committee, Mar. 7.

Mr. Rockwell appeared as a member of the Citizens Foreign Aid Committee and urged Congress to reduce foreign aid sharply so that domestic industry can survive.

He quoted STEEL, Apr. 6, 1959, "The Case of the Vanishing Jobs," which related how 66,230 U. S. workers' jobs went to other lands because of increased imports. In another quote from "The Case of the Vanishing Taxes," May 11, 1959, he said: "The Navy saved $37,000 over the U. S. price on a ship plate contract, but our government lost $67,000 in taxes because our steel mills lost the order, so the minimum net loss in federal income was $30,000."

# Low cost grinding of small parts... Landis Grindwell general purpose cylindrical grinder

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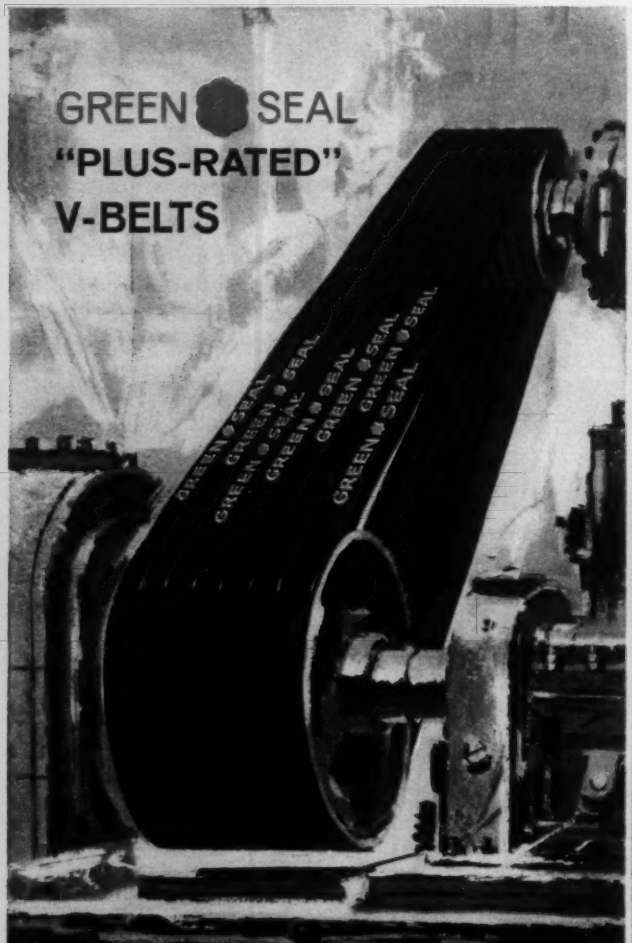
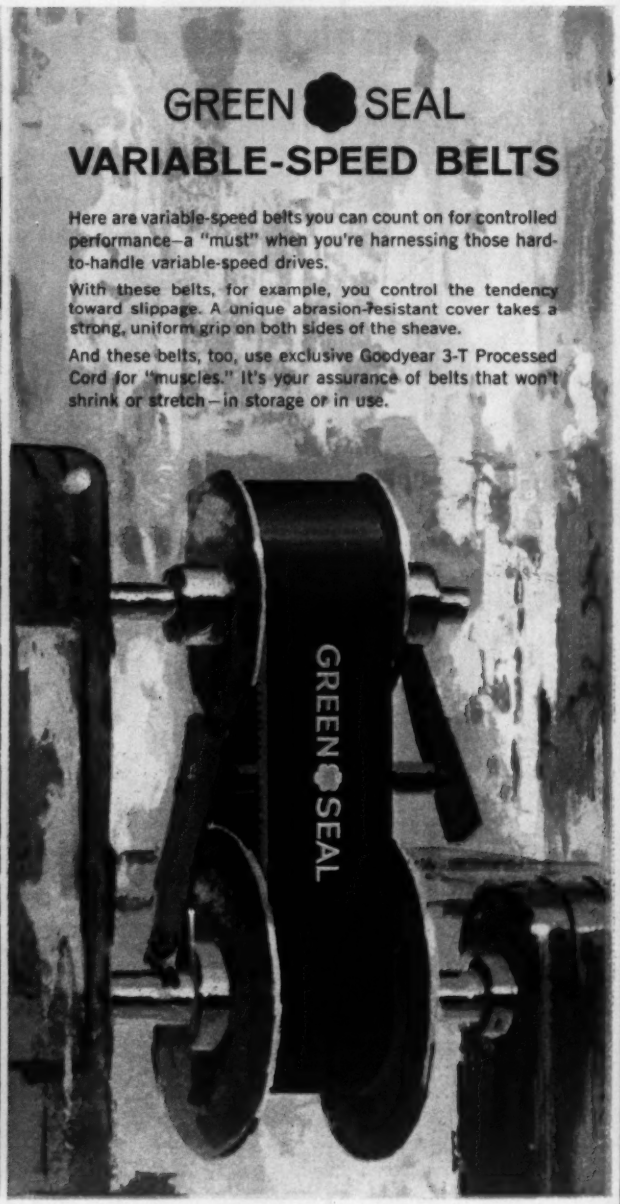



Team-matched Green Seal V-Belts—now "plus-rated" to give you top horsepower-hours per dollar – always pull together perfectly—whether a drive uses 2 or 50 belts.

Secret is their complete dimensional stability – built-in through unique tension members of airplane-type steel cable or exclusive Goodyear 3-T treated Cord.

These belts stay dimensionally stable, too – no matter how long you store them. That's a big factor when it comes to stocking stand-by belts for emergency use.

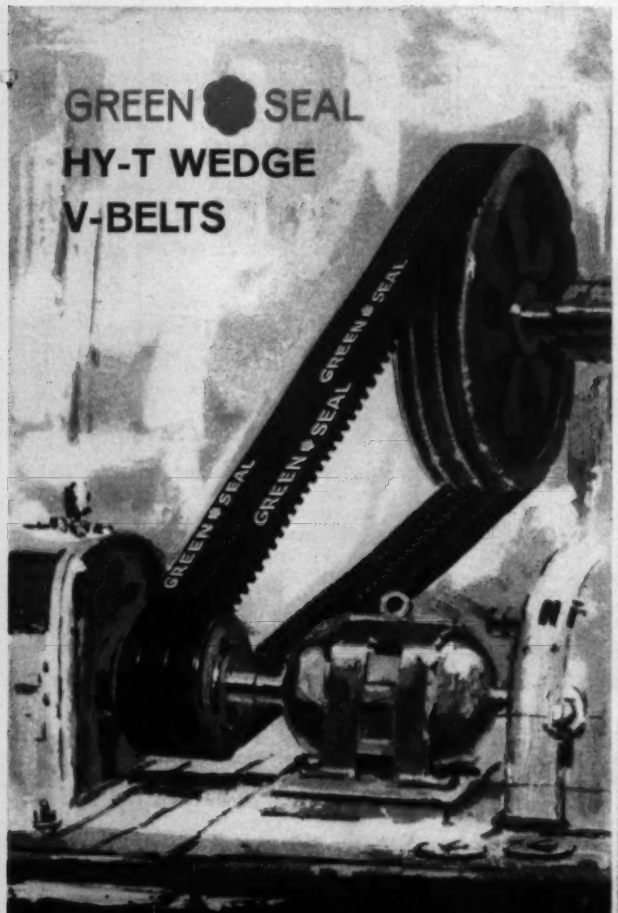

GREEN SEAL
VARIABLE-SPEED BELTS
Here are variable-speed belts you can count on for controlled performance—a "must" when you're harnessing those hard-to-handle variable-speed drives.
With these belts, for example, you control the tendency toward slippage. A unique abrasion-resistant cover takes a strong, uniform grip on both sides of the sheave.
And these belts, too, use exclusive Goodyear 3-T Processed Cord for "muscles." It's your assurance of belts that won't shrink or stretch – in storage or in use.
GREEN SEAL

NO MATTER WHAT YOU'RE BELTING–OR WHAT TYPE BELT IT CALLS FOR–YOU CAN COUNT ON A GOODYEAR BELT FOR MAXIMUM, TROUBLE-FREE HOURS AT MINIMUM COST. JUST CONTACT THE

THE BIG NAME IN V-BELTS: **GOODYEAR**

STEEL

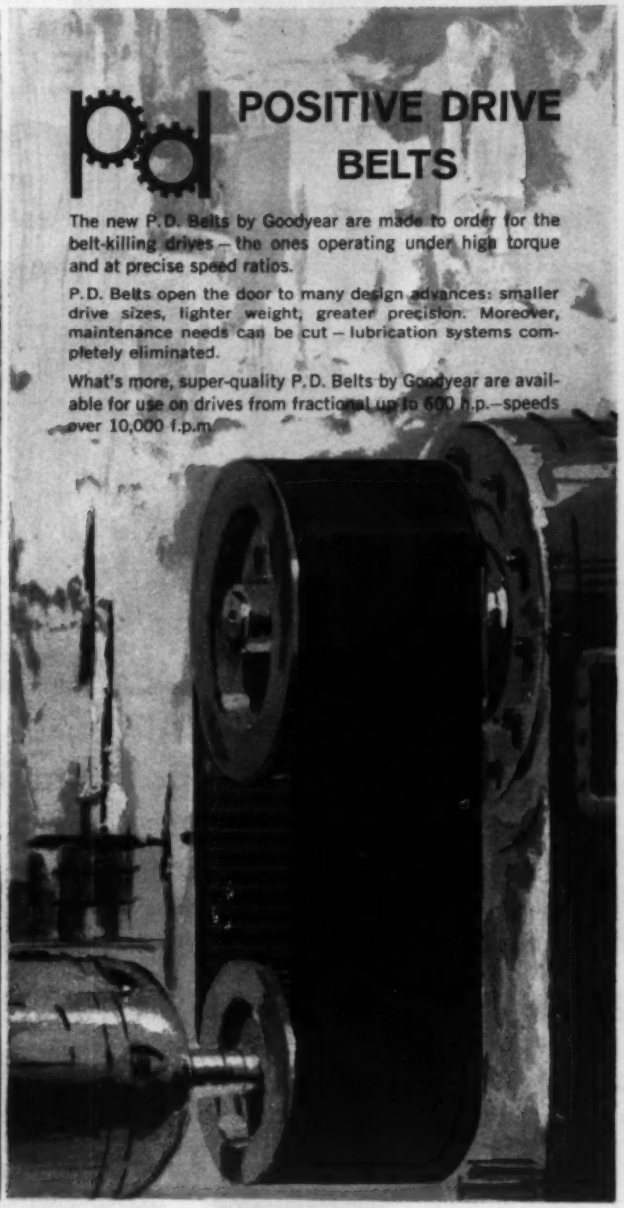
# go down the line with Goodyear




With these new, "wedge" V-Belts, you can belt the same horsepower on drives as much as 50% smaller – saving as much as 20% in drive costs.

You see, the new HY-T WEDGE design eliminates excess "fat" without the sacrifice of strength. And HY-T WEDGE V-Belts are made in 3 different cross sections to meet all requirements. All 3 are oil-resistant and static-conducting at no extra cost.

And they're all Green Seal quality – the only wedge-type V-Belts offering you 3-T construction for perfect team performance.




The new P.D. Belts by Goodyear are made to order for the belt-killing drives – the ones operating under high torque and at precise speed ratios.

P.D. Belts open the door to many design advances: smaller drive sizes, lighter weight, greater precision. Moreover, maintenance needs can be cut – lubrication systems completely eliminated.

What's more, super-quality P.D. Belts by Goodyear are available for use on drives from fractional up to 600 h.p.–speeds over 10,000 f.p.m.

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YEAR

THE GREATEST NAME IN RUBBER

Green Seal, HY-T WEDGE, P.D.–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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## IRON or STEEL
# CASTINGS

**Available from one of the South's Largest Basic-lined Electric Furnaces . . .**

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CONTRACT MANUFACTURING including HEAVY CASTINGS


## CALENDAR
### OF MEETINGS

**Mar. 28-29, Material Handling Institute Inc.:** Spring meeting, Pittsburgh-Hilton Hotel, Pittsburgh. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

**Mar. 30, Industrial Truck Association:** Spring meeting, Pittsburgh-Hilton Hotel, Pittsburgh. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

**Apr. 3-6, National Screw Machine Products Association:** Annual meeting, Ambassador Hotel, Los Angeles. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

**Apr. 4-6, Metallurgical Society of AIME:** Annual national open hearth steel conference and blast furnace, coke oven, and raw materials conference, Palmer House, Chicago. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

**Apr. 4-6, National Industrial Conference Board Inc.:** Annual atomic energy conference, Waldorf-Astoria Hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

**Apr. 4-7, American Management Association:** Packaging show and conference, Convention Hall, Atlantic City, N. J. Association's address: 1515 Broadway, New York 36, N. Y.

**Apr. 4-7, Nuclear Congress and Atomic Exposition:** Coliseum, New York. Coordinator: Engineers Joint Council, 29 W. 39th St., New York 17, N. Y. Secretary: E. Paul Lange.

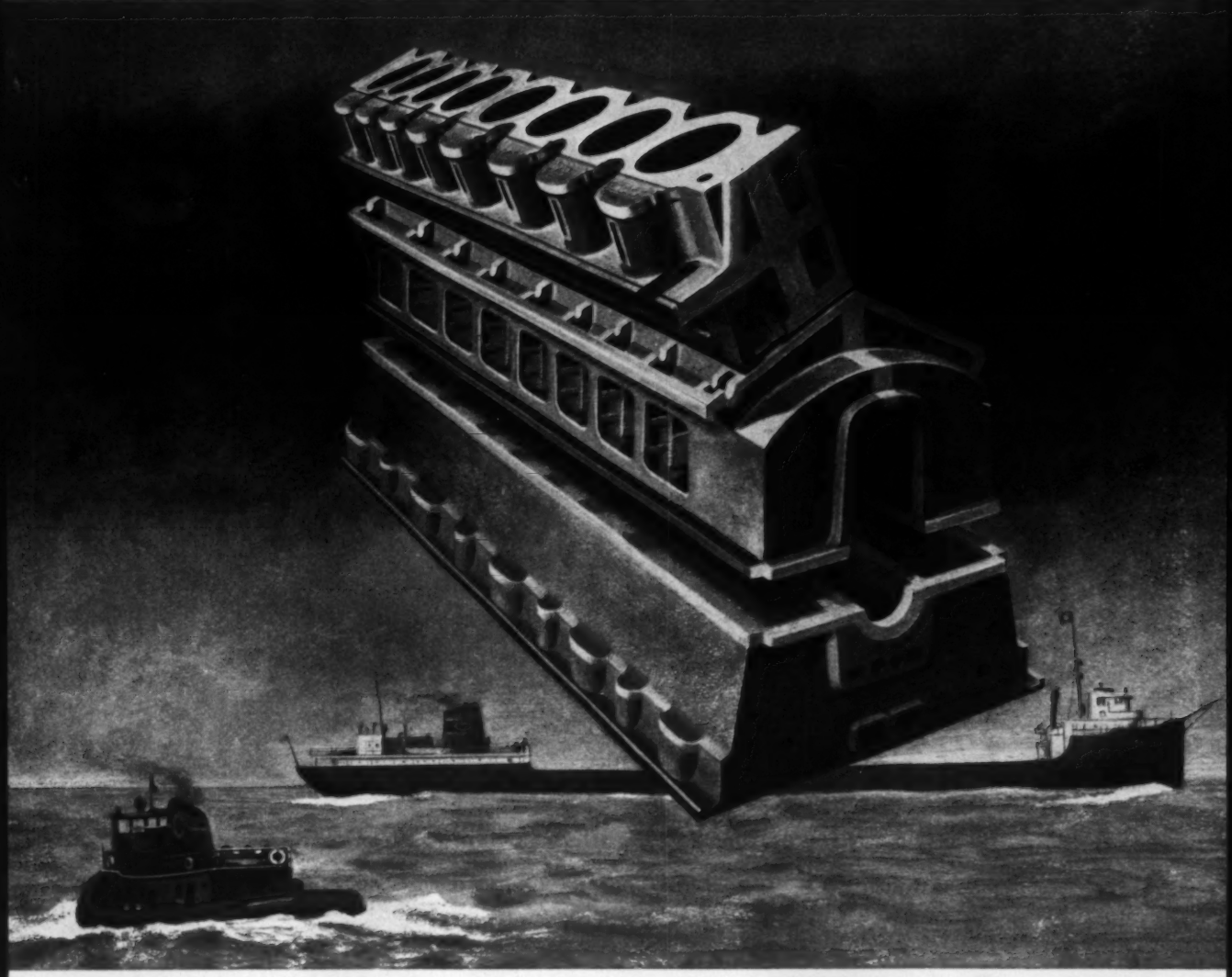
**Apr. 5-8, Society of Automotive Engineers Inc.:** National aeronautic meeting, production forum, and engineering display, Hotel Commodore, New York. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

**Apr. 5-14, American Chemical Society:** National meeting, Public Auditorium, Cleveland. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

**Apr. 6-8, American Zinc Institute Inc. and Lead Industries Association:** Joint conference and annual meetings, Chase-Park Plaza Hotel, St. Louis. Information: LIA or AZI, 60 E. 42nd St., New York 17, N. Y.

**Apr. 12-14, Steel Shipping Containers Institute Inc.:** Annual meeting, Breakers Hotel, Palm Beach, Fla. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

*How the Foundry Industry Serves America . . . #5 of a Series*



## 5 REASONS WHY IRON CASTING IS SPECIFIED FOR 7700-H.P. DIESEL CRANKCASE

Fabrication of steel was first specified for this 35,000-lb. crankcase of a 7700-hp. marine diesel engine. But, after careful study, the obvious advantages of gray iron dictated the final choice of a gray iron casting.

The excellent vibration damping characteristics of gray iron assure the lowest possible noise level. The rigidity and mass which is easily designed into a casting contributes to permanent alignment. Gray iron gives good engine heat distribution. The inherent stability of gray iron eliminates need for stress relieving. And because of the large amount of drilling and tapping required, the easy machinability of gray iron is an important advantage. All of these qualities were taken into consideration before the specifications were changed from steel weldment to gray iron casting.

For the production of structurally sound iron castings, Hanna Furnace provides foundries with all regular grades of pig iron . . . foundry, malleable, Bessemer, intermediate low phosphorus, as well as HANNATITE® and Hanna Silvery.

*Facts from files of Gray Iron Founders' Society, Inc.*

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THE BEST KNOWN NAME IN IRON

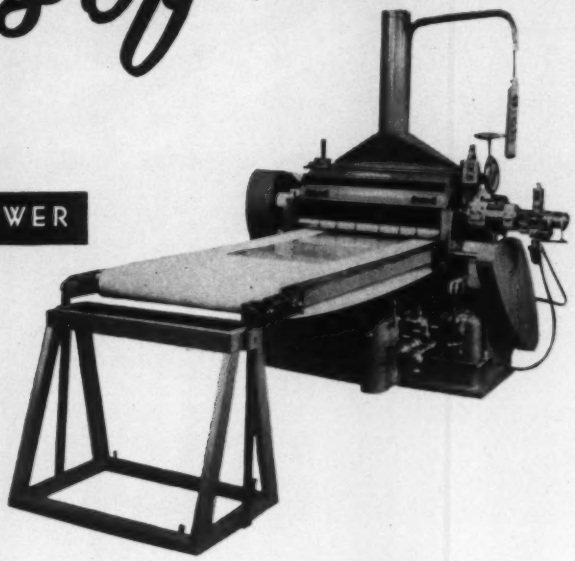
**THE HANNA FURNACE CORPORATION**
*Buffalo • Detroit • New York • Philadelphia*

*Hanna Furnace is a division of* **NATIONAL STEEL CORPORATION**

# Tubercles of Rust?

## HERE IS THE ONE PASS ANSWER

Incredibly, the new, the versatile Clair model 309 Pinch - Roll, Thru - Feed Surface Finishing Machine does a job for steel heretofore thought impossible.



**1** For end-users who are confronted with the costly problem of insidious rust on hot and cold rolled sheet.

**2** For fabricators who require surfaces exhibiting clean, uniform, fine grit scratch patterns to assure maximum adhesion of protective and decorative coatings.

**3** For manufacturers who demand long range protection against recurring corrosion in service. For most any problem, this is the "one-pass" answer.

NINE OTHER SPECIALIZED CLAIR MODELS ARE ALSO AVAILABLE

# CLAIR

## MANUFACTURING CO., Inc., OLEAN, N. Y.

**Offering the Most *VERSATILE* Line of Surface Finishing Machines**

*Order bearing bronze in any lengths up to 105", diameters up to 9"*

## ASARCON 773 (SAE 660) CONTINUOUS-CAST BRONZE

Asarcon 773 can cut your replacement bearing costs many ways. Buying only the lengths you need means no short-end scrap. Your choice of diameters up to 9" reduces diameter loss—only 1/32" to 3/32" to machine off. Every Asarcon bar is unconditionally guaranteed to be free of blow holes, pits, or sand inclusions. No shrinks; no hard or soft spots. Better, more uniform properties. Order Asarcon 773 from stock in 260 sizes, solids, and tubes, from a national network of distributors. Write for address of nearest stock point, and complete data, to Continuous-Cast Department, American Smelting and Refining Company, Barber, N. J. or Whiting, Ind.

**ASARCO**

AMERICAN SMELTING AND REFINING COMPANY

**CONTINUOUS CAST DEPARTMENT**

West Coast Distributor: Kingwell Bros., Ltd., 457 Minna Street, San Francisco, Calif. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal. Distributors in many principal cities.

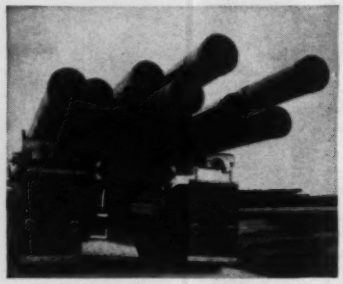
**9:47 A.M.** Customer phones order to District Office.

**10:01 A.M.** Customer's tape for the item is pulled from file. There are 10,000 customer tapes in a typical District Sales Office. Only variables are typed on re-orders.

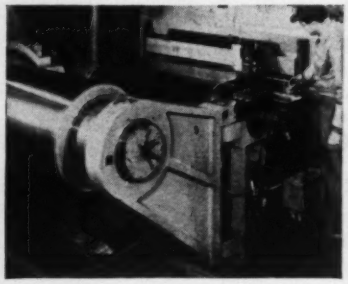
**10:30 A.M.** The Cleveland Teletype Switching Center automatically relays the order to the proper service center.

# HOW REPUBLIC'S NEW "MINUTE MAN"

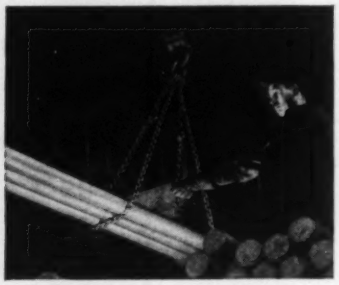
## How Republic's High Speed Communication System Helped Three Customers



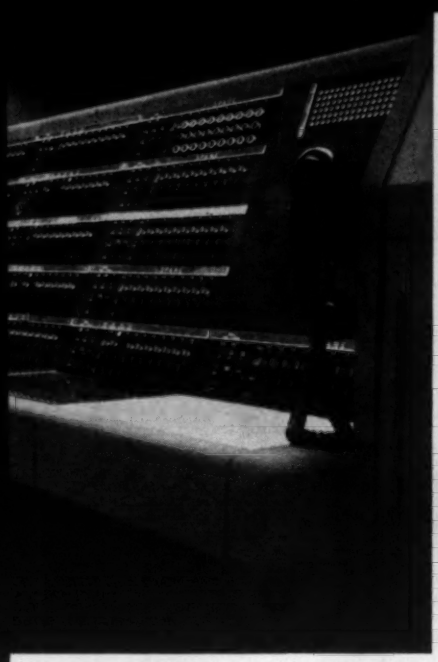
**Tulsa ordered at 10:00 A.M. and Chicago shipped at 5:00 P.M. the same day.** A customer's inquiry from Tulsa for oil country casing and tubing was teletyped to Cleveland at 10:07. Cleveland located the material in stock at the Chicago mill and answered the inquiry at 10:15. Forty-five minutes later the order was confirmed. The order was shipped from Chicago by 5 o'clock that same day. Just one example of how Republic's sales and production teams are keyed to solve customers' delivery problems.

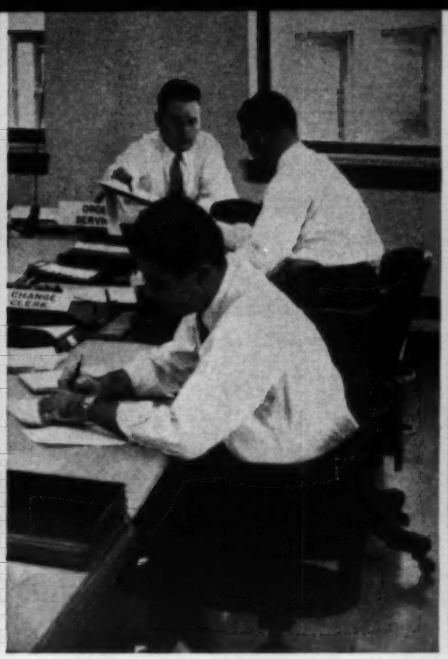


**"Need stainless steel in quantity, and need it in a hurry"**, a sink manufacturer phoned our Chicago Distributor. Approximately forty-five hours after the phone call, Republic's Massillon mill had the order of ENDURO® Stainless Steel rolled, slit, shipped, and in the customer's plant. An unusual instance? Perhaps, but it does show again, how Republic's high-speed communication system is geared to keep pace with industry's growing demands for service and quality.



**From inquiry to delivery within two days.** A Detroit forging customer needed hot rolled bars quickly, to fill an order. Within minutes after the inquiry, the Cleveland service center located steel billets in semi-finished form at the Buffalo steel plant. Result—the Buffalo mill received the order in detail the same day of the inquiry. The bars were rolled that night and shipped the next day. Now, knowledge of Republic mills is concentrated and available to customers within minutes.





**10:38 A.M.** A team of service center "Minute Men" quickly selects the right mill to satisfy the customer's specified quality and delivery.

**11:30 A.M.** Mill receives order containing metallurgy, shipping instructions, and all details.

# SERVICE SPEEDS STEEL DELIVERIES

Fast delivery is always a point of competition among steel mills. Republic now applies automation to cut order processing from days to minutes: it reduces paper work and production time—speeds delivery. This increase in service gives Republic customers another competitive edge in today's market.

From the first click of the teletype key, Republic's sales and production teams go to work. Within a matter of seconds, customer orders can be sent from any one of 22 district sales offices to the Cleveland Switching Center. Here orders are relayed automatically to any one of six service centers where a team of Republic "Minute Men" check specifications, confirm orders, and determine mill schedules. Once the order has been processed at the service center, it is relayed automatically to the proper mill for scheduling—all in a matter of a few hours.

Installed after three years of research and development by Republic, this electronically-automated system has literally revolutionized methods and organization for processing sales orders.

In addition to speedier handling, customer specifications are filed on paper tapes for repeat order use. The possibility of error is reduced and duplication of records eliminated.

"Minute Man" service on steel deliveries is only the first step of a comprehensive program. Research and planning is under way to extend the automatic system of scheduling and processing within the plant. A battery of electronic brains will provide the statistical information needed to plan and control operations more efficiently.

Automation is but one example of Republic's continuous effort to improve customer service.

## REPUBLIC STEEL

*World's Widest Range of Standard Steels and Steel Products*

REPUBLIC STEEL

**REPUBLIC STEEL CORPORATION**
**DEPT. ST -8112**
**1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO**

Please send me more information on:

☐ Casing and Tubing ☐ Stainless Steel

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

You can do **two things** to guard yourself against cancer: Have an annual health checkup. Alert yourself to the seven danger signals that could mean cancer:

**1.** Unusual bleeding or discharge. **2.** A lump or thickening in the breast or elsewhere. **3.** A sore that does not heal. **4.** Change in bowel or bladder habits. **5.** Hoarseness or cough. **6.** Indigestion or difficulty in swallowing. **7.** Change in a wart or mole.

If your signal lasts longer than two weeks, go to your physician. Give him the chance to give you the chance of a lifetime.

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New Model H-120 Hough "PAYLOADER" built to scoop 20% more load because of the great strength of USS MAN-TEN and "T-1" Steels.

## USS "T-1" and MAN-TEN Steels

# cut 1 ton of dead weight from this bigger PAYLOADER®

Two thousand pounds of weight have been chopped from the front end of this new Hough H-120 "PAYLOADER" by designing with USS "T-1" and USS High-Strength Steels. Result: one ton more capacity . . . increased reach and dumping height . . . better balance . . . stronger construction . . . lower operating costs.

This is another case where the greater tensile properties of the high-strength steels and the *extra* high strength of USS "T-1" Steel (100,000 psi minimum yield strength) made possible a superior designed machine. About 4,000 pounds of USS "T-1" Constructional Alloy Steel in ½" and ¾" plate and ½" x 5" bars are used in the boom arms, rocker arms, and bucket attachment brackets. The bucket is 5/16" USS MAN-TEN Brand High-Strength Steel—a 50,000 psi minimum yield point grade.

The bucket lift assembly was designed to a working stress, which, multiplied by a reasonable safety factor, comes up to the full minimum yield strength of "T-1" Steel. The 2,000 pounds of weight saved went directly into increased payload capacity—20%. The new "PAYLOADER" can handle 12,000 pounds instead of the 10,000 pounds of the experimental design. This is just what the customers wanted. No other steel offered such a high ratio of strength to weight.

The first 150 of these Hough tractor shovels are already giving outstanding service. More are being built. The combination of USS "T-1" and MAN-TEN Steels in the new "PAYLOADER" provides high strength with low total cost, lighter weight and freedom from maintenance.

For more information on any of these USS special steels, write to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

The Frank G. Hough Co. is a subsidiary of International Harvester Co.

*USS, "T-1" and MAN-TEN are registered trademarks of United States Steel. "PAYLOADER" is a registered trademark of The Frank G. Hough Co.*

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Columbia-Geneva Steel—San Francisco
National Tube—Pittsburgh
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

**United States Steel**

# This is a space ship floor maker

Sometime within the next several years, the first American will soar into orbit around the earth. He will be sealed in a small, cone-shaped space capsule mounted atop an Atlas missile. The missile will climb 100 miles in less than six minutes, where the capsule will disengage and go into orbit. The man will be alone in space.

The vehicle for this historic voyage is already in production, under the auspices of the National Aeronautics and Space Administration's "Project Mercury." One of the possible methods of heat protection is a beryllium heat sink, forged on two giant steel dies. Both dies are USS Quality Steel Forgings. The top die (shown being rough-machined on one of our vertical boring mills) will be convex, 20 inches thick and will weigh 26,520 pounds. The bottom die, concave and 18 inches thick, weighs 27,700 pounds. Both are 92 inches in diameter.

The heat sink of the space capsule will also be its leading face when re-entering the atmosphere. It will be traveling 18,000 miles per hour, subject to thousands of degrees of temperature and many times the force of gravity. Naturally, it has to have superb strength and heat-resistant characteristics. By the same token, the dies that shaped the capsule floor had to be perfect.

After forging, both dies were subjected to preliminary heat treating and preliminary machining. Then came quenching and tempering. A battery of tests followed: ultrasonic inspection, tangential tensile tests, Charpy V notch impact tests, grain size tests, bend tests and magnetic particle inspection. Only then were the dies ready to take the incredible forging pressure, exerted by the giant hydraulic closed-die forging press where the beryllium disc was formed.

We invite your inquiries or requests for our free 32-page booklet on USS Quality Forgings. Just write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

*USS is a registered trademark*

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

**United States Steel**

USS

# Wood proves Stainless Steel is simple to fabricate

*General Sales Manager, C. Paul Carlson, points to the Stainless Steel milk cans designed and manufactured by the John Wood Company.*

There's probably no one that has more experience and know-how with Stainless Steel fabrication than the John Wood Company. At eight different plants in the U. S. and Canada, the company makes everything from gasoline pumps to milk strainers. At their St. Paul plant they are equipped to produce 50% of the Stainless Steel can requirements for the entire dairy and dispenser industries.

The company worked closely with sanitation experts and health officials to design a Stainless Steel can that meets the strictest regulations for both material and workmanship. And at the same time, they found ways to simplify fabrication and save time and materials. They developed methods of hydraulic forming, welding, grinding and polishing that have paid off in lower costs and a quality product. These Stainless cans have a hard, durable finish that is easy to clean, ready for long, sanitary service. The John Wood Company proved that Stainless Steel isn't difficult to fabricate, it's just different.

If *you* would like to have complete information about working with Stainless Steel, write for a free copy of our *Stainless Steel Fabrication Book*. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

*USS is a registered trademark*

USS

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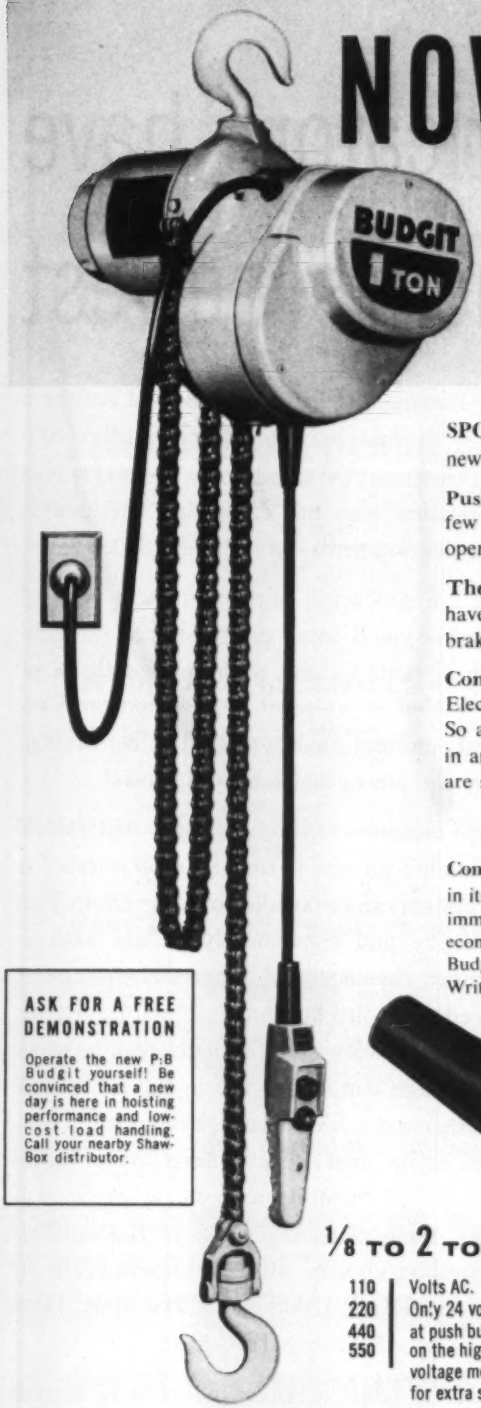
**United States Steel**

# NOW P:B BUDGIT®

## ELECTRIC HOIST

## "FRACTURES FRACTIONS"




**SPOTTING** speed and accuracy are "right on the button" with this new Push Button Budgit Electric Hoist.

**Push button action** is so sensitive you can spot loads precisely in a few ticks of time. The control station fits the palm for one-hand operation, leaving the other hand free to guide the load.

**The P:B Budgit has two automatic brakes.** Heavy-capacity cranes have the same type of load brake. It's the only hoist with mechanical brake built into the motor. Each brake alone can hold the load.

**Compartmented components** add still more value to the P:B Budgit Electric Hoist. All electricals are enclosed, safe from dirt and moisture. So are the motor and motor brake. Gearing and load brake operate in an oil bath, sealed against airborne substances. Maintenance needs are simple as can be.

### SEE BULLETIN FOR DETAILS

**Compare the new P:B Budgit Hoist** with any other electric in its class. It's a portable hoist you hang up, plug in, and use immediately with top efficiency, safety, convenience, and economy. Get full details, plus data on pull cord operated Budgit Hoists in AC, DC, and 12-volt battery powered models. Write for Bulletin 15010-15C today.

**ASK FOR A FREE DEMONSTRATION**

Operate the new P:B Budgit yourself! Be convinced that a new day is here in hoisting performance and low-cost load handling. Call your nearby Shaw-Box distributor.

**1/8 TO 2 TONS**

110 | 220 | 440 | 550 — Volts AC. Only 24 volts at push buttons on the higher voltage models for extra safety.

**AUTHORIZED SERVICE STATIONS** from coast to coast save time, trouble, and money for every Budgit user.

60 A-1

MAXWELL MANNING MM& MOORE INC. TRADE MARK

***BUDGIT ELECTRIC HOISTS***

***A Product of***

**MANNING, MAXWELL & MOORE, INC.**

*Shaw-Box Crane & Hoist Division • Muskegon, Michigan*

*In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*

*in only 90 days...*

# 101 aluminum fabricators have ...Amchem's newest

## ALODINE 1200S protects aluminum best ...at less cost, in less time!

To the hundreds of long-time users of Amchem Alodine—the first, low cost effective surface conversion treatment for aluminum—add a new host of fabricators who are employing the newest Alodine development—ALODINE 1200S!

If you are producing aluminum—any type of aluminum—you'll want to investigate the production advantages and profit potentialities of this new Alodine pre-paint process that provides constant, uniform quality as well as big savings in time, equipment and processing costs!

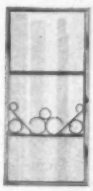
Through increased chemical activity ALODINE 1200S slashes processing time *up to 50 percent!* A 1200S system can be installed on your production line quickly and conveniently . . . and bath is maintained chemically . . . no special equipment required to control contamination! In an ALODINE 1200S system, products can be processed through continuous dip in the same time cycle other conversion coatings require for continuous spray lines! That means lower initial equipment and maintenance costs, wider range of product applications regardless of the application method—brush, dip, continuous strip or spray. ALODINE 1200S is qualified under Government Specification MIL-C-5541.

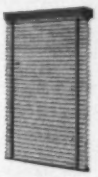
ALODINE 1200S is Amchem's positive answer to constant uniform quality in aluminum processing. Put its assured protection and production flexibility to work for your aluminum products and market them with greater confidence!

# switched to Alodine 1200S conversion coating!

**FASTER, LOW COST, EFFECTIVE AND FLEXIBLE, ALODINE 1200S IS PROVIDING NEW HIGHS**

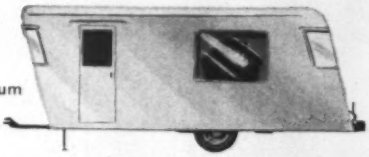
aluminum stop signs

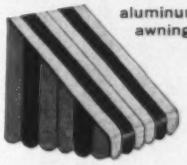

aluminum doors


aluminum venetian blinds

**IN CORROSION RESISTANCE AND PAINT BONDING QUALITIES TO THESE AND**

aluminum cameras


aluminum house trailers


aluminum awnings

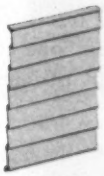
**MANY MORE FINE PRODUCTS IN THE ALUMINUM INDUSTRY. YOU, TOO, CAN**

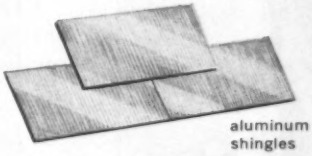
aluminum boats

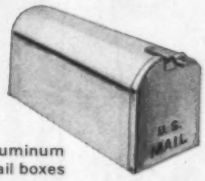
aluminum license plates

aluminum missile parts

**UPGRADE YOUR PRODUCTS' CONSUMER APPEAL WITH ALODINE PROTECTION.**


aluminum siding


aluminum shingles



aluminum mail boxes

**CONTACT YOUR NEAREST AMCHEM REPRESENTATIVE FOR COMPLETE DETAILS!**

AMCHEM

# ALODINE 1200S

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(Formerly American Chemical Paint Co.)

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# Your new plant or expansion idea

**Raw materials available?**

**Right process chosen?**

**Location correct?**

**Capacity adequate?**

**Economically sound?**

**Readily financed?**

Kaiser Engineers designs and builds major facilities for the Steel industry, and is U. S. licensor for the proven L-D Process of oxygen steel making.

Among KE's most valued services are sound, searching economic analyses, feasibility studies and site evaluations. In a word—*Pre-Engineering*—impartial, outside analysis which helps you decide whether to proceed with, defer, or modify the project.

Kaiser Engineers offers you cost-saving, time-saving, one-company service from concept through start-up.

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Division of Henry J. Kaiser Company
Oakland 12, California
Pittsburgh, Washington, D. C., Chicago, New York

• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5489-3

# SLICE COSTS BY SLICING PARTS FROM EXTRUDED SHAPES

**Fabricating parts from long lengths of "premachined" shapes reduces machining, scrap, and finishing**

The lock components shown above are typical of some 20 different precision brass parts which Welch, Inc., Waukegan, Ill., makes for its broad line of locks and latches, from Anaconda extruded shapes.

Welch works closely with Anaconda specialists from early design stages. New lock mechanisms are built around parts which can be cut by a metal slitting saw from long lengths of extruded shapes with minimum subsequent machining and scrap. The use of bar stock is never considered when there is the slightest possibility of designing savings into a part by means of a brass extrusion.

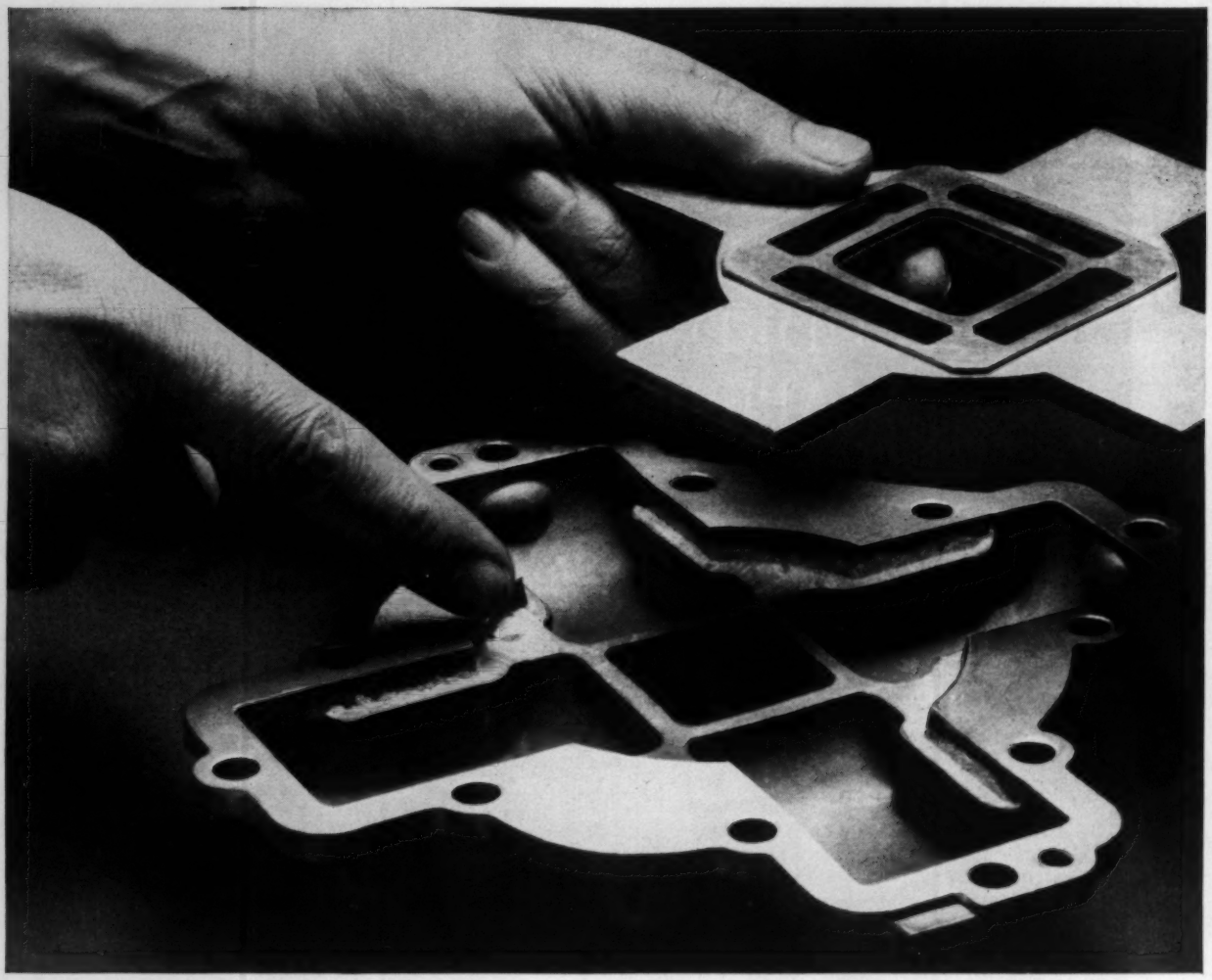
**Superior quality, too.** Parts made from extruded shapes are characterized by their strong, homogeneous, wrought-metal structure. And the smooth, extruded surfaces reduce many finishing operations.

More and more manufacturers are cutting fabricating costs *and* maintaining quality by using these preformed or, in effect, "premachined" shapes. For imaginative and practical help in adapting extruded shapes to the economical production of intricate parts, call your Anaconda representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

**Extruded Shapes • Special-Shape Tubes • Die-Pressed Forgings**

**ANACONDA®**

*products made by The American Brass Company*



**SEPARATE CASTINGS,** bonded together in areas indicated, form complete complex casting shown on the right.

# Cut rejects! Fabricate complex castings with

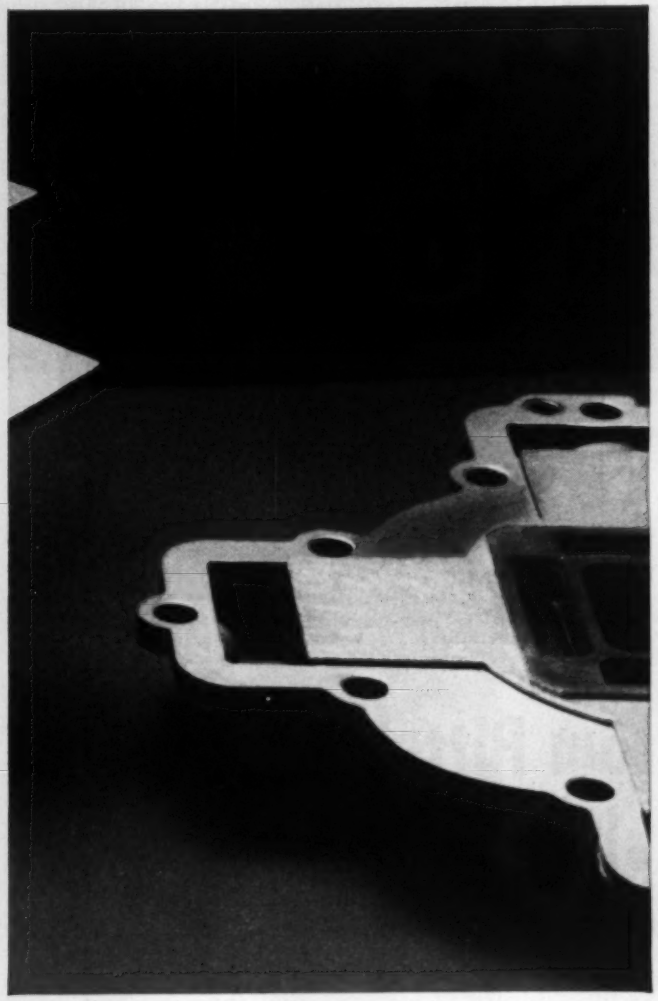
Now you can simplify production of hollow castings —and end costly rejects by casting them in sections, then bonding the sections together with high-strength SCOTCH-WELD Structural Adhesives, such as EC-1386!

By so doing, you eliminate the high rejection rate that often accompanies sand molding. You eliminate the costly machining and equipment required for mechanical fastening. You eliminate the wasteful, space-consuming bosses or flanges.

All you need is a flow gun and an oven. EC-1386 is a 100% non-volatile liquid and is solvent free. Thus, waste is negligible; no pre-drying is required before joining the sections. The adhesive bond can be cured to high ultimate strength quickly in an air-circulating oven (one to two minutes at 500°F. bond line temperature). And the cured bond can be machined for final touch-up operations. EC-1386 also serves to fill in voids, so that parts need not be held to close tolerances.

See how EC-1386 can help you cut costs, simplify and speed production and improve product quality. And learn how other 3M Adhesives are helping the metalworking industry. Contact your 3M Field Engineer. Or write: AC&S Division, 3M Company, Dept. SBEE-30, St. Paul 6, Minnesota.

"SCOTCH-WELD" and "CORO-GARD" are Reg. T.M.'s of 3M Co.

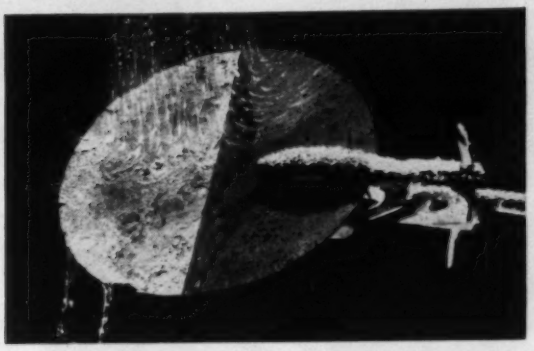


# SCOTCH-WELD®

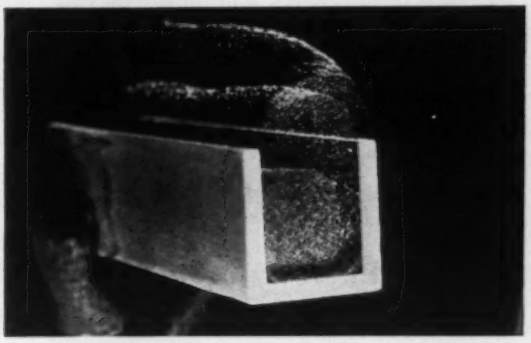
BRAND STRUCTURAL ADHESIVES

**COLD SANDWICH BONDING.** 3M Adhesive EC-1357 makes it possible for you to bond sandwich panels with a nip roller or cold press. You need no clamps or heated presses to complete tough core-to-skin bonds that resist moisture and high and low temperatures. This one adhesive bonds a variety of materials quickly, economically. Its dark color absorbs infrared heat quickly, dries fast.

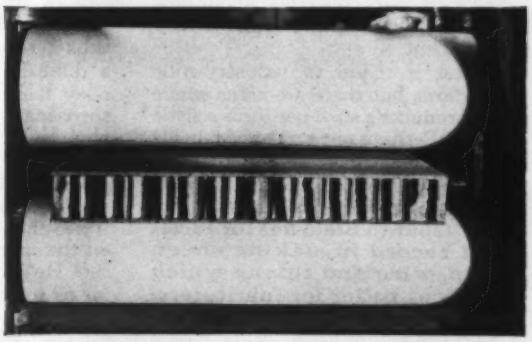
## News about other 3M products



**CORROSION RESISTANT COATING.** CORO-GARD® 1706 Brand Protective Coating resists corrosive fluids and fumes, water and abrasion. It passed these torture tests: 2000-hour corrosive salt spray attack; 20-week submersion in 20% solution of hydrochloric acid; 6-month weather exposure in Miami, Florida. For steel, aluminum, wood, concrete, cloth, even some plastics.



**SURE WAY TO SEAL.** 3M Heat Expandable Sealers expand up to 125% under the normal heat of a paint-baking cycle, cure to a tough, flexible mass that keeps out dirt, water and weather, completely seal even the most irregular gap or seam. The unexpanded solid is also efficient as a gasket replacement sealer, flange sealer and for other sealing jobs.

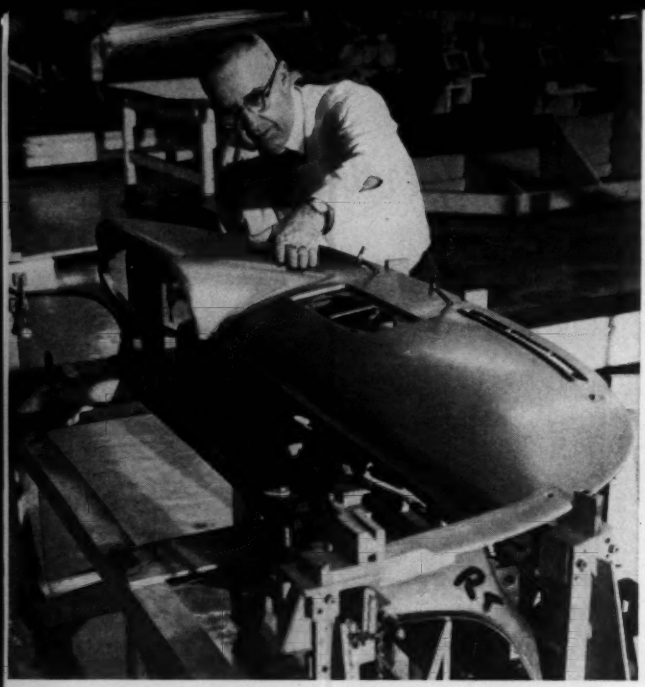


ADHESIVES, COATINGS AND SEALERS DIVISION

**MINNESOTA MINING AND MANUFACTURING COMPANY**

**...WHERE RESEARCH IS THE KEY TO TOMORROW**

3M COMPANY



**Pattern Sheet**—In the plant of one of the world's largest auto makers, Pittsburgh Steel Co.'s Pattern Sheet was used to make instrument panels. Pattern Sheet is cold rolled sheet steel with a design rolled right into the steel.

**Sheet Steel**—International Harvester specified cold rolled sheet steel from Pittsburgh Steel Co. for many components of the bodies it makes for light trucks. International Harvester demands fine surface, good weldability and formability.

# When Steel From Pittsburgh Means "Pittsburgh Steel"

## Pittsburgh Steel Co. Provides Blue Chip Companies With Wire, Sheet and Tubes For Everything From Missiles to Hairpins

Performance is the payoff. Go into any manufacturing plant where steel sheet, wire or tubing is pressed, stamped, cut, welded or otherwise formed into finished products. You'll find steel users concerned about how the steel they buy performs on their equipment.

Steel is made to industry-wide standards but there are areas where one producer's steel performs a little better. Perhaps one mill's sheet holds to the exact thickness desired more consistently. Or maybe it consistently does better on tensile strength.

**Pittsburgh Steel has an excellent record in making sheet, strip, wire and tubing which performs better for fabricators.**

Photographs on these pages take you into some fabricating plants and to field applications where specifications for steel are precise because users demand good performance. Pittsburgh Steel makes good by meeting these demands.

Take International Harvester Company. Using cold rolled sheet from Pittsburgh Steel Co., International Harvester combines good styling with ruggedness in light truck bodies.

• **Switched to Pittsburgh Steel**—One of the oldest and largest ball bearing makers now uses mechanical tubing from Pittsburgh Steel to make a difficult bearing part. Formerly, alloy bars were used for this high speed machining operation. The company switched to Pittsburgh Steel tubing because it provided more pieces per day, longer tool life, less machining and a lower cost material.

See that oil field "roughneck" up on the monkey board of an oil well rig? He's working on a rig drilling for oil in the middle of a grapefruit grove near McAllen, Tex. On that job Chief Engineer M. D. Frazier of Texkan Oil Co., said: "If you don't have good pipe you have no well. We've never run into defects with Pittsburgh Steel's seamless tubing."

The little springs in the photograph at right have a tough job. Each of these carburetor pump springs will keep a motorist moving although he may never know of their busy life under the hood of his car. Made of music wire only .014 inch thick these springs are made from wire drawn by Pittsburgh Steel's subsidiary, Johnson Steel & Wire Co. Performance of the steel is tops.

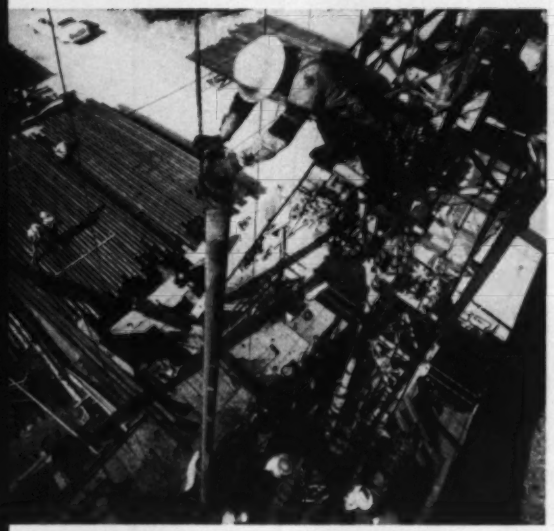
**Or take those seat cushions for a compact car. Stubnitz Greene Corp. uses Pittsburgh Steel wire to coil this new kind of seat spring, Torflex Spring, because the steel performs well on coiling machines.**

A new product, one of many in the making, was developed in 1959. It is Fab-Form, a permanent steel form for concrete floor and roof slabs, which speeds work and lowers costs. Longer and wider than its competitors, it is supplied to users with a new welding technique which speeds installation.

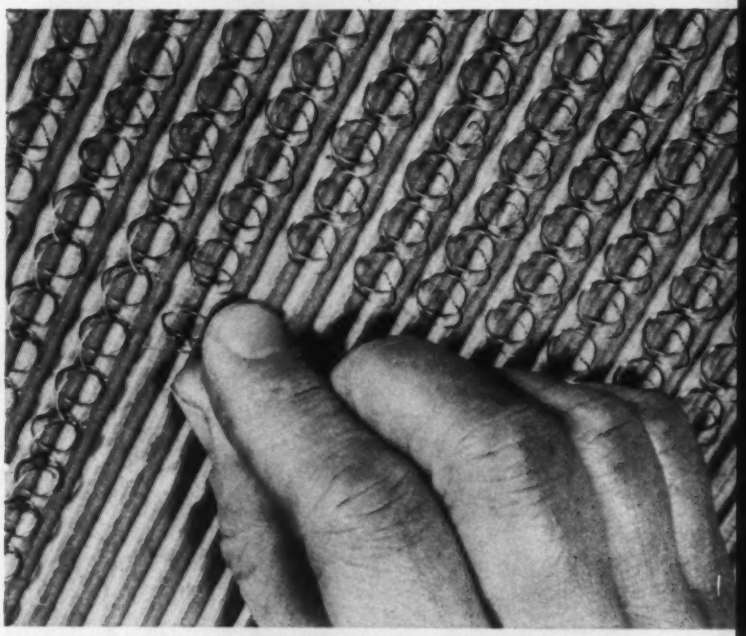
All this is typical of the company's quiet determination to improve facilities, widen markets and diversify products so that customers, employees and stockholders all may benefit.

**Manufacturers Wire**—Used here to make a new type spring used in the seat and back cushions of a compact car, Pittsburgh Steel Co.'s manufacturers wire is consistently dependable.

**Seamless Mechanical Tubing**—Not a new weapon but mechanical tubing from Pittsburgh Steel being processed into a bearing part. This manufacturer switched from alloy bars to Pittsburgh tubing and reduced production costs.



**Seamless Oil Country Goods**—That's what they call drill pipe, casing and oil well tubing in the oil fields. Here Pittsburgh Steel casing is being run into a 7,500-foot deep well in Texas.



**Fine Wire Specialties**—Wispy but precise as the pattern they make on the gummed pallet are carburetor pump springs coiled from music wire made by the subsidiary Johnson Steel & Wire Co.

**Construction Products**—A new Pittsburgh Steel product—Fab-Form—goes down on joists preparatory to pouring a concrete slab. Fab-Form is a permanent steel form for concrete roof or floor slabs.

# Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

**DISTRICT SALES OFFICES**

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| Atlanta | Cleveland | Detroit | Los Angeles | Pittsburgh |
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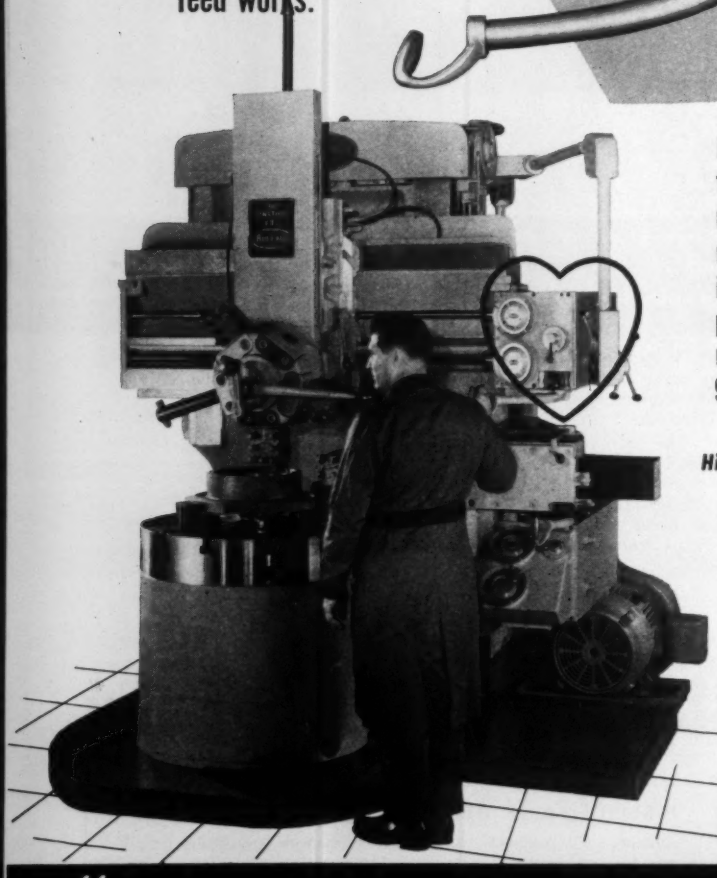
# This is the Heart of DYNATROL*

By means of a single lever or from a simple remote control all head motions, traverse and feed engagement are accomplished through this revolutionary new feed works.



Dynatrol* provides infinitely variable feed rates throughout the full range and variable traverse rates from zero to nine feet per minute. Feed rates may be advanced or retarded while the machine is cutting to obtain maximum tool performance and productivity. Ten sizes from 26" to 144" table diameter. Send to The Bullard Company, Bridgeport 9, Conn. for complete catalog.

***High Spot Features of the Dynatrol *V.T.L. include:***

***VERSATILITY***

Available equipment includes: Bullard variable speed drive for infinitely variable table speeds throughout the full range with no loss of usable horsepower. Fully automatic operation by Bullard Man-Au-Trol or point-to-point or continuous path numerical control systems.

Unique Size-Au-Trol* for accurate positioning of all heads. Contouring attachments: Hydraulic, electronic or electro-hydraulic. Four of five-sided power-indexing turret heads. Thread cutting, drum scoring and angle turning attachment. Power-operated chucks.

***COMPACTNESS***

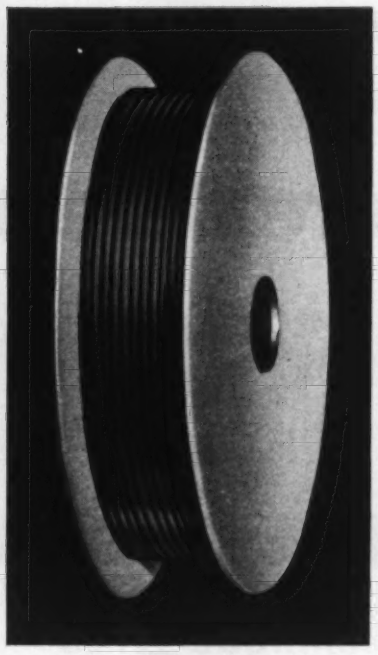
The new Bullard Dynatrol V.T.L. is compact in design, rigid in construction, lower in height, reduced in floor area.

***EASE OF MAINTENANCE***

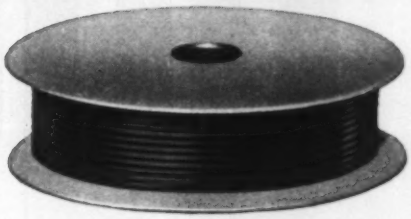
Automatic lubrication throughout . . . fewer parts . . . fewer adjustments . . . easily accessible.

*Trade Mark

**"YOU CAN'T BEAT A BULLARD"** BULLARD



# Save with WOLVERINE Level-Wound Coils



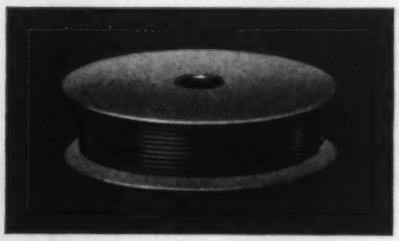
**WOLVERINE LEVEL-WOUND COILS**
are ideal for feeding automatic equipment — often release operators for other duties.

**WOLVERINE LEVEL-WOUND COILS**
permit tubing to unwind at high speeds without danger of tangling or snarling.

**WOLVERINE LEVEL-WOUND COILS**
reduce tube handling—save time in assembly line operations.

**WOLVERINE LEVEL-WOUND COILS**
permit you to stock more tube in less space —help reduce inventory problems.

**WOLVERINE LEVEL-WOUND COILS**
contain tubing made the Tubemanship-way—quality controlled tubing that is backed by research, years of experience and sound engineering.



Your Wolverine sales representative has the complete story. Why not talk it over with him—let him show you exactly how Wolverine level-wound coils can fit into your manufacturing process to save you time, money and labor. Write, too for your copy of the Wolverine Tubemanship Book.

CALUMET & HECLA, INC.
CALUMET DIVISION
URANIUM DIVISION
GOODMAN LUMBER DIVISION
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**WOLVERINE TUBE**
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Manufacturers of Quality Controlled Tubing and Extruded Aluminum Shapes

J-8367

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA. SALES OFFICES IN PRINCIPAL CITIES.

*Advance Progress Report*

# CF&I-Wickwire develops DOUBLE

## *New wire drawing technique gives you longer-lasting wire rope*

CF&I-Wickwire's premium wire rope – Double Gray – has now been improved by a remarkable new wire drawing technique. This new wire rope – Double Gray-X – provides EXTRA LONG LIFE.

Wickwire's advanced wire drawing process is the joint effort of our research engineers, metallurgists and key production people. They sought to reduce the friction between the wires within the rope itself, thus producing a wire rope with greater resistance to bending fatigue. An important step in Wickwire's new wire drawing process is the use of *molybdenum disulphide*.

"Moly Disulphide" builds a thin, permanent molecular shield around each wire. Coupled with Wickwire's other advanced wire processing techniques, it gives these results:

- *Friction-free interaction of the individual wires in every strand of Double Gray-X* – A molecular jacket of Moly Disulphide on each wire helps cushion them against the effects of bending, crushing and abrasion. As the rope operates over sheaves, for example, the molecular shield tends to prevent the wire surfaces from grinding against each other, reducing friction and wear.

# a superior wire rope

# GRAY-X

- *Smoother surface to the wires*—In any wire, tiny imperfections occasionally form on the surface. These "weak links" can cause premature breaking of the wires and impair the life of the rope. Moly Disulphide helps eliminate any minute nicks, creating smoother-surfaced wires.
- *Higher degree of toughness which is essential to longer wire rope life*—Moly Disulphide greatly minimizes the friction involved in the drawing operation, thus preventing the wires from "heating up". This assures the correct physical properties for every wire in Double Gray-X and helps the wire retain its original toughness.

Double Gray-X will be made in a wide range of sizes and constructions to give greater operating economy and reduced downtime for all types of rope-using equipment. It will be available soon from CF&I-Wickwire's chain of warehouses and through a network of nationwide distributors.

**EXTRA STRENGTH**

**In addition to longer life, Double Gray-X gives you the extra strength of Double Gray Wire Rope. Made of extra improved plow steel with an Independent Wire Rope Core, this rope gives 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.**

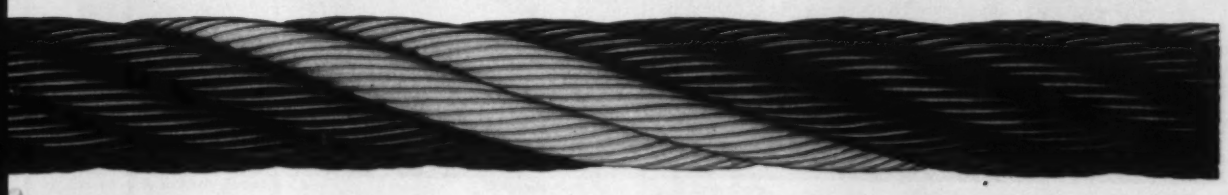
7484

## WICKWIRE ROPE

**THE COLORADO FUEL AND IRON CORPORATION**

CF&I STEEL

*In the West:* **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso
Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Odessa (Tex.) • Oklahoma City
Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Tulsa • Wichita
*In the East:* **WICKWIRE SPENCER STEEL DIVISION**—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.)
New Orleans • New York • Philadelphia



*MIRRO'S GOAL:*
# DOUBLED OUTPUT IN NEXT DECADE

*MIRRO'S CHOICE:*
# LOEWY ROLLING MILLS

Mirro Aluminum Co., Manitowoc, Wis., recently dedicated its new rolling mill facility, the first fully integrated plant of its kind in the state. Since its aim is to double sales in the next 10 years by increasing the output of its existing products and by high-volume production of newly developed lines, Mirro knew it needed superior rolling mill equipment . . . equipment that can handle the *entire* job with optimum efficiency every step of the way.

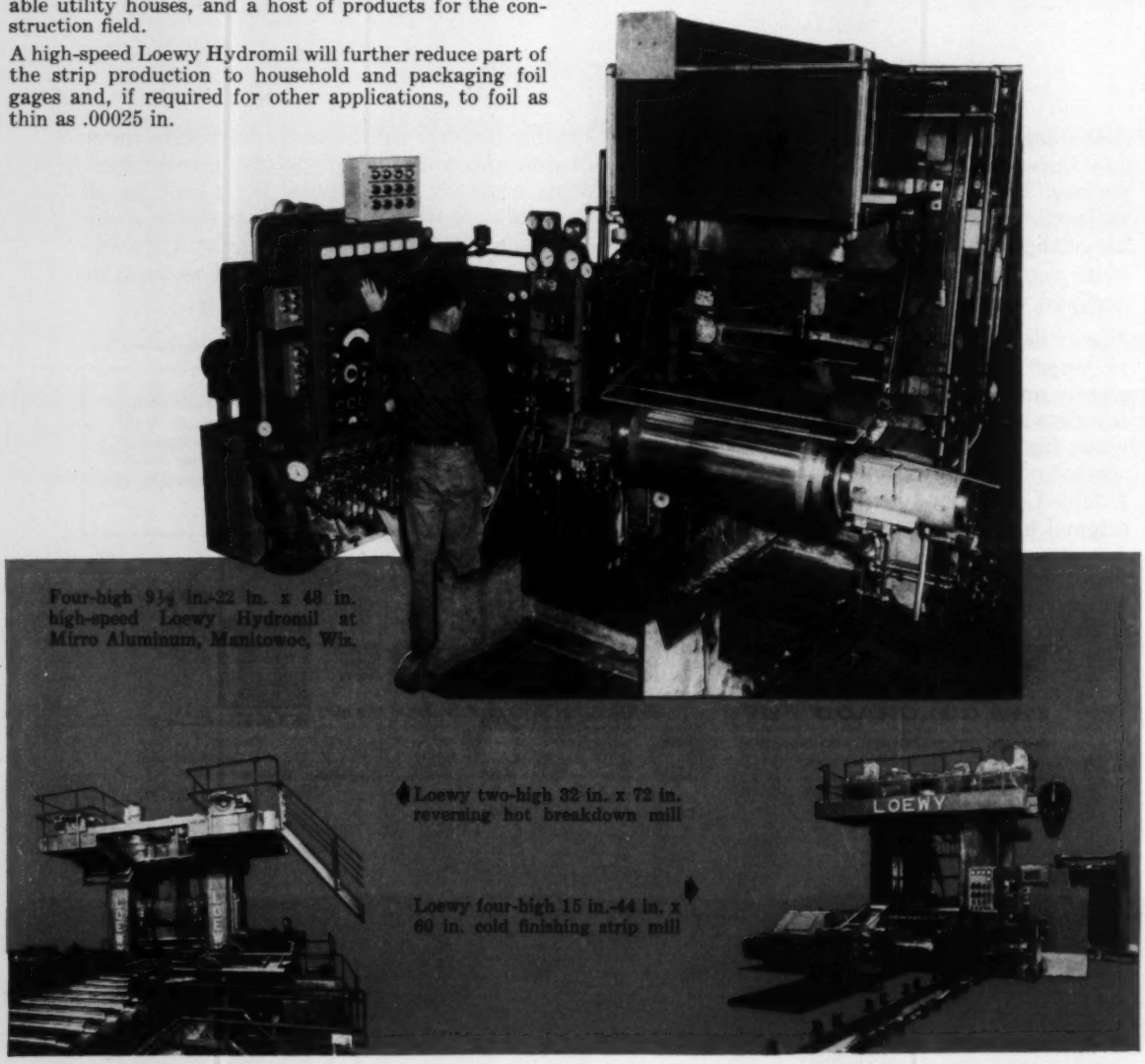
The choice was Loewy.

A Loewy two-high reversing hot breakdown mill will roll 5000-lb. slabs down to thin plate and coil strip. A Loewy four-high cold finishing mill will reduce the hot-rolled strip to finished sheet gage suitable for the manufacture of cooking utensils, electric housewares, toys, boats, portable utility houses, and a host of products for the construction field.

A high-speed Loewy Hydromil will further reduce part of the strip production to household and packaging foil gages and, if required for other applications, to foil as thin as .00025 in.

Loewy specially designed rolling mill and auxiliary equipment for hot and cold working of ferrous and nonferrous metals are in operation throughout the United States and many foreign countries. If you want to expand your production economically and improve product quality, let us know your requirements. Write Dept. B-3 for further information and literature.

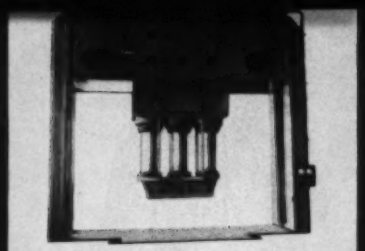
BALDWIN · LIMA · HAMILTON
Industrial Equipment Division • Philadelphia 42, Pa.



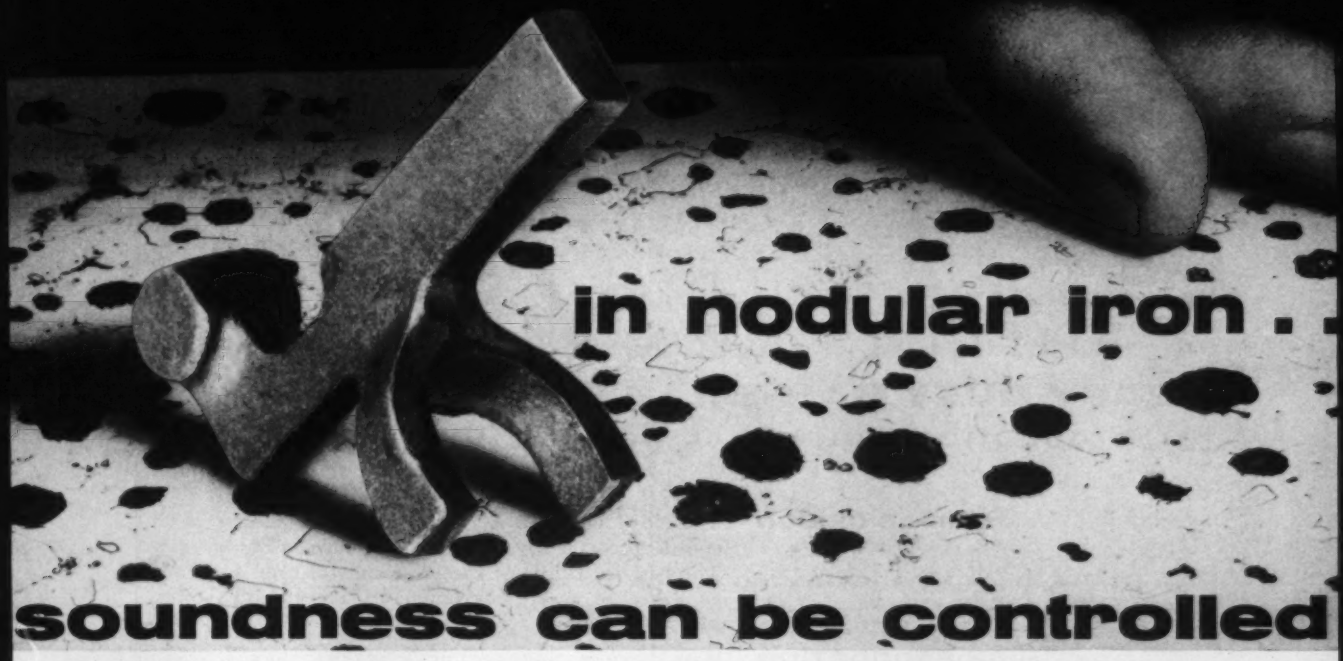

Four-high 9¼ in.-22 in. x 48 in. high-speed Loewy Hydromil at Mirro Aluminum, Manitowoc, Wis.

Loewy two-high 32 in. x 72 in. reversing hot breakdown mill

Loewy four-high 15 in.-44 in. x 60 in. cold finishing strip mill



You can depend on the uniform structure and properties of Meehanite nodular whether the casting weighs ½ ounce as pictured below or many hundreds of pounds. Photograph above shows a 1500 ton Hydraulic press with Meehanite rams.



# in nodular iron . .

# soundness can be controlled

## Meehanite foundries have the "know-how" and experience

There is nothing new about nodular or ductile cast iron, but the problem is that not every foundry has the metallurgical know-how and facilities to produce castings that live up to published claims.

When you purchase nodular iron from a Meehanite foundry you can always be sure of getting dependable castings that possess the desired engineering advantages — *high strength, ductility, toughness.*

The consistent, high quality of Meehanite castings is achieved by a "proven" manufacturing procedure used by Meehanite foundries throughout the world. Meehanite foundries have over a quarter of a century of experience in the manipulation and use of the essential processing materials needed to convert the graphite in cast iron from the flake form into the nodular.

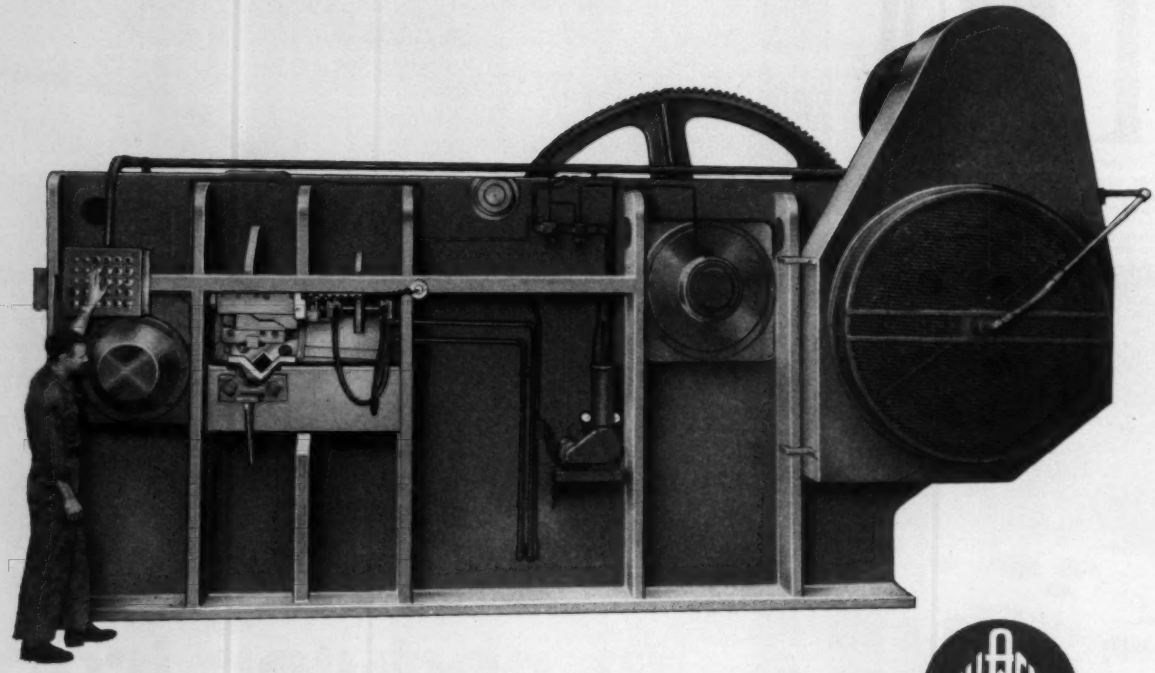
Put this experience to work for you. Avoid the risk of costly defects. Seven different "S" types of Meehanite nodular are available and there is a nearby Meehanite foundry ready to serve your needs.

For more facts about Meehanite Nodular Iron write for your FREE copy of our new bulletin No. 47. Write today to Meehanite Metal Corp., 714 North Ave., New Rochelle, N.Y.

# MEEHANITE METAL

The American Laundry Machinery Co., Rochester, N. Y.
Atlas Foundry Co., Detroit, Mich.
Banner Iron Works, St. Louis, Mo.
Barnett Foundry & Machine Co., Irvington, N. J.
Casting Service Corp., LaPorte, Indiana and Bridgman, Michigan
Centrifugally Cast Products Div., The Shenango Furnace Co., Dover, Ohio
Compton Foundry, Compton, Calif.
The Cooper-Bessemer Corp., Mt. Vernon, Ohio and Grove City, Pa.
Crawford & Doherty Foundry Co., Portland, Ore.
Dayton Casting Co., Dayton, Ohio
Empire Foundry Co., Tulsa, Okla. and Bonham, Texas
Florence Pipe Foundry & Machine Co., Florence, N. J.
Fulton Foundry & Machines Co., Inc., Cleveland, Ohio
General Foundry & Mfg., Flint, Mich.
Georgia Iron Works, Augusta, Ga.
Greenlee Foundries, Inc., Chicago, Ill.
Hamilton Foundry Inc., Hamilton, Ohio
Johnstone Foundries, Inc., Grove City, Pa.
Kanawha Manufacturing Co., Charleston, W. Va.
Kennedy Van Saun Mfg. & Eng. Corp., Danville, Pa.
Lincoln Foundry Corp., Los Angeles, Calif.
Oil City Iron Works, Corsicana, Texas
Palmyra Foundry Co., Inc., Palmyra, N. J.
The Henry Perkins Co., Bridgewater, Mass.
Pohlman Foundry Co., Inc., Buffalo, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sonith Foundries of FMC, Indianapolis, Ind.
Standard Foundry Co., Worcester, Mass.
The Stearns-Roger Mfg. Co., Denver, Colo.
Vulcan Foundry Co., Oakland, Calif.
Washington Iron Works, Seattle, Wash.
Dorr-Oliver-Long, Ltd., Orillia, Ontario
Hartley Foundry Div., London Concrete Machinery Co., Ltd., Brantford, Ontario
Otis Elevator Co., Ltd., Hamilton, Ontario

MEEHANITE METAL CORPORATION, NEW ROCHELLE, NEW YORK



# HILL ACME
## HEAVY DUTY BAR-BILLET SHEAR
for production cutting of heavy billets

**SIMPLE DESIGN** The No. 1200 HILL ACME BAR-BILLET shear cuts large diameter squares of various tensiles. The basic principle of the lever and fulcrum is employed to insure maximum efficiency with low power input.

**HIGH PRODUCTION** With a free running speed of 26 cuts per minute the production of square, accurate lengths will appreciably reduce cutting costs.

**VERSATILE** Knives will accommodate many sizes of rounds, flats, squares or special shapes without the necessity of knife change.

**LOW COST** Initial machine cost is attractive and maintenance cost comparisons are impressive.

**PROVEN EFFICIENCY** Now proven through four years of successful operation in nationally known plants. Available with fully automatic, semi-automatic or hand feed.

**SIZE RANGE** HILL ACME BAR-BILLET shears are made in a range of sizes to efficiently accommodate every commercial requirement. Available in either right or left hand models.

Bulletin BB-59 gives complete details.

MMT-PE

**The HILL ACME Company**

*Also manufacturers of:*
ROTARY SHEARS • "CANTON" ALLIGATOR SHEARS • HILL HYDRAULIC SURFACE GRINDERS • GRINDING & POLISHING MACHINES • "ACME" FORGING • TAPPING MACHINES • "CLEVELAND" KNIVES AND SHEAR BLADES • MECHANICAL LIFTERS

**1201 West 65th St., Cleveland 2, Ohio**

## *Roebling Tire Bead Wire: Packaged for Maximum Benefit*

The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that you need not accumulate empty reels means storage space requirements are cut to *less than half*. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

**ROEBLING**

*Branch Offices in Principal Cities*
*John A. Roebling's Sons Division*
*The Colorado Fuel and Iron Corporation*

# A NEW IMPACTOOL

## ...WITH EXTRAS THAT PAY OFF FOR SMART TOOL BUYERS!

**6-Vane Air Motor**
Compare a "six" with a "four"! I-R's 6-Vanes give you greater power, smoother operation, higher starting torque.

**"2-Pack" Construction**
Either the impact mechanism "pack" or the motor "pack" can be serviced individually without disturbing the other.

**Rugged Steel Hammer Case**
For a lifetime of service! This exclusive I-R feature protects hammer mechanism, but is lightweight for easy handling.

*new*
Size 808 Impactool
⅝" drive

**"Cuss-proof" Socket Retainer**
Sockets can't fall off accidentally, but strong, spring-held retainer can be easily replaced. Another I-R exclusive.

**Built-in Air Control**
Air-balanced throttle valve provides full power range with smooth and complete control. Not just an "on and off" throttle.

**Precision Quality**
Special electronic equipment double-checks machined parts for perfect mating of all surfaces and bores.

**LOOK FOR I-R EXTRAS BEFORE YOU BUY!**

Smart buyers and experienced tool men know these Ingersoll-Rand EXTRAS pay off . . . in terms of longer tool life, easier maintenance, and better nut running performance. With them you get 20% more power and 200% faster rundown in a precision tool so small (7½") and light (8⅞ lbs.) you can use it anywhere.

For details on the all-new Size 808 Impactool, call your I-R representative today. Or write: Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

34A-8

**Ingersoll-Rand**
*Tools plus AIRengineering increase output per man*

## McDonald Re-opens War on Rebels

United Steelworkers' President David J. McDonald has dramatically revived a union problem most observers thought was dead. At a meeting of the newly formed USW Legislative Committee of Pennsylvania, he struck out at the Dues Protest rebels who put up candidates against him in the 1957 union election. He roared: "By God, you've got to get up and fight these bedbugs. Don't leave it all to Dave McDonald." The outburst got a cheer from 600 delegates, but observers don't see why he is so excited.

## How Industries Are Faring

Material handling equipment bookings in January held at the December, 1959, level, reports the Material Handling Institute . . . January heat treating billings rose 19.1 per cent above the year-earlier level, says Metal Treating Institute . . . "At the moment, we are perilously close to a specific downturn . . .," warns Orrin B. Werntz, executive vice president, National Screw Machine Products Association—an industry that often is a bellwether . . . Orders for new freight cars in February declined to 3411 from 7149 in January (but up vs. 1803 in February, 1959), reports the American Railway Car Institute . . . Industrial heating equipment orders in February were down 5 per cent from January but up 81 per cent vs. February, 1959, notes Industrial Heating Equipment Association . . . February sales of industrial supplies and equipment rose 2.7 per cent above those for January and 14 per cent above those for February, 1959, indicates the National Industrial Distributors' Association.

## Economist Sees Record Year; No Dangerous Decline Ahead

Dr. John W. Harriman, economist for Tri-Continental Corp., believes 1960 will be "a record year without a dangerous boom and without a dangerous decline." He looks for steel ingot production to reach 120 million tons and passenger car sales to hit 6 million units. He says inflationary forces have diminished; most industries have excess capacity; distribution facilities are becoming more efficient; carrying costs are high. "There is every incentive to keep inventories at the practical minimum."

## Rising: Wholesale Prices, Employment, Business Failures

The government's wholesale price index for all commodities other than farm and food rose 0.8 per cent in February. The metals and metal products

index climbed 1.3 per cent; the machinery and motive products index rose 1.4 per cent . . . 500,000 workers were added to the nation's employed in February—26,000 of them in durable goods manufacturing, reports the Labor Department . . . Business failures rose to 1214 in February (rate, 50.7 annually per 10,000 businesses), 5 per cent above the year-earlier mark, reports Dun & Bradstreet Inc.

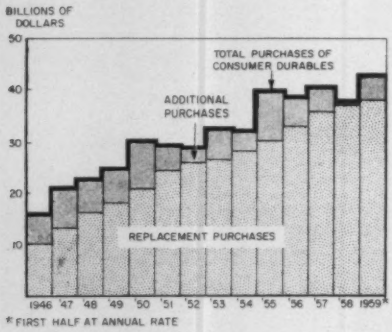
## AISI Will Improve Foreign Relations

Four U. S. experts on design of earthquake-proof structures have left for Agadir, Morocco, to study structures damaged by a violent quake which took 10,000 lives early this month. They expect to turn up valuable technical information which will aid in rebuilding the torn area. The men (l. to r.): R. W. Binder, chief engineer, Pacific Coast Div., Bethlehem Steel Co.; T. R. Higgins, American Institute of Steel Construction; Prof. Ray Clough, University of California; and W. G. Kirkland, chief of the engineering division, AISI.

## Treasury's Depreciation Proposal Shelved

The House Ways & Means Committee has voted to shelve the Treasury Department's proposal to treat profits from the sale of depreciated property as ordinary income instead of as capital (STEEL, Mar. 21, p. 89). Small business proponents in Congress are responsible for the defeat. Industry, generally, was against the measure. In return for passage of the capital gains proposal, Treasury offered only vague promises to show more leniency in accepting taxpayers' judgment and practices on depreciation rates and salvage values.

## Replacement Sales Grab More of Consumer Durables Market



*FIRST HALF AT ANNUAL RATE

This chart, prepared by Ford, Bacon & Davis Inc., New York engineering firm, shows how replacement buying dominates the purchases of consumer durable goods—and how that share of the market grows steadily while new purchases fluctuate wildly with the economic times. It indicates the direction for marketing attention.

## Machine Tool Show to Have Big Communications Network

The Machine Tool Exposition—1960, to be held in Chicago's International Amphitheatre Sept. 6-16, will have one of the most extensive communication

setups ever seen in an industrial exhibit. The 130 exhibitors will have 200 special noise suppressing phones (about 1000 machine tools will be in operation). The main switchboard will be equipped to handle 5000 or more calls daily. A 75 booth, long distance phone center will be supplied by Illinois Bell Telephone Co.; Western Union will set up a branch telegraph office; the registration area will be equipped with a dialing intercom.

## New IBM Machines Telephone One Another

This IBM Data Transceiver with "digital subset feature" permits companies to transmit punched card data over standard telephone lines at regular toll call message rates or over high speed telegraph circuits. Speed: Ten cards a minute. The IBM 7701 transmits magnetic tape data via telephone and telegraph. Speed: 150 characters a second.

## Small Firm Tackles the Big Boys

Gregory Industries Inc. (Employment: About 325) is going into a field dominated by such industrial giants as Olin-Mathieson Chemical Corp. and Remington Arms Co. Inc. Gregory's Nelson Stud Driver Div. is marketing a new line of powder actuated tools, fasteners, and charges.

## Railroads Are Promoting Michigan

The railroads are entering the battle to reclaim Michigan as a strong industrial state. New York Central has prepared a brochure describing 16 parcels of land (3428 acres) adjoining its tracks from Detroit to Kalamazoo. It has nine departments set up to help prospects decide whether to locate in Michigan.

## Small Firms Lean More Heavily Toward Leasing

More than half of all equipment leases being written today are for firms with assets of $500,000 or less, reports Nationwide Leasing Co., Chicago. Average lease term: 3.7 years. Firms of that size had about $65 million worth of production equipment on lease at the end of 1959. Here's who leases how much, reports Nationwide:

| Total assets | % of total firms leasing | % of total dollar volume |
|---|---|---|
| Over $1 million | 22.1% | 53.8% |
| $750,000-$1 million | 11.2 | 14.5 |
| $500,000-$750,000 | 14.5 | 10.6 |
| $200,000-$500,000 | 17.4 | 15.6 |
| $35,000-$200,000 | 34.8 | 5.5 |

## Trend to More Expensive Homes

A survey of 178 builders by Cleveland Electric Illuminating Co. finds a decided trend to more expensive homes. In 1959, homes priced under $20,000

accounted for 53 per cent of the builders output of single family dwellings; this year, only 38 per cent will be in that class. Homes priced over $25,000 will account for 34 per cent of the volume (vs. 29 per cent last year). Other trends: Fewer basements, more family rooms, more homes with four or more bedrooms, more built-in appliances.

## Straws in the Wind

U. S. Steel Corp. and Food Machinery & Chemical Corp. will build a research facility near Kemerer, Wyo., for experimental production of metallurgical coke from sub-bituminous coal . . . Kaiser Aluminum & Chemical Corp. restarted a potline at its Mead Reduction Works last week . . . American Motors Corp.'s Canadian unit will build a 250,000 sq ft, $3.5 million, auto assembly plant in suburban Toronto this year . . . In Dunkirk, N. Y., tomorrow, Alco Products Inc. will unveil the nation's first prefabricated, skid-mounted, nuclear power reactor . . . 95 per cent of cleaning maintenance cost is labor, notes National Sanitation Supply Association . . . The government should divide with U. S. silver producers the profit it makes by coining the metal it buys from them, Shattuck Denn Mining Corp. asserts.

## A Computer in Your Shirt Pocket

General Electric Co. is marketing what appears to be a near ultimate in miniaturization—tiny micromodular electronic circuits "ready for use in such commercial products as a computer no larger than a cigarette pack." The circuits are made of ceramic and metal discs which work as vacuum tubes and transistors. A stack of them the size of one cigarette can do the work of 44 electronic components, GE asserts.

## Group to Promote Use of Vinyl-Metal Laminates

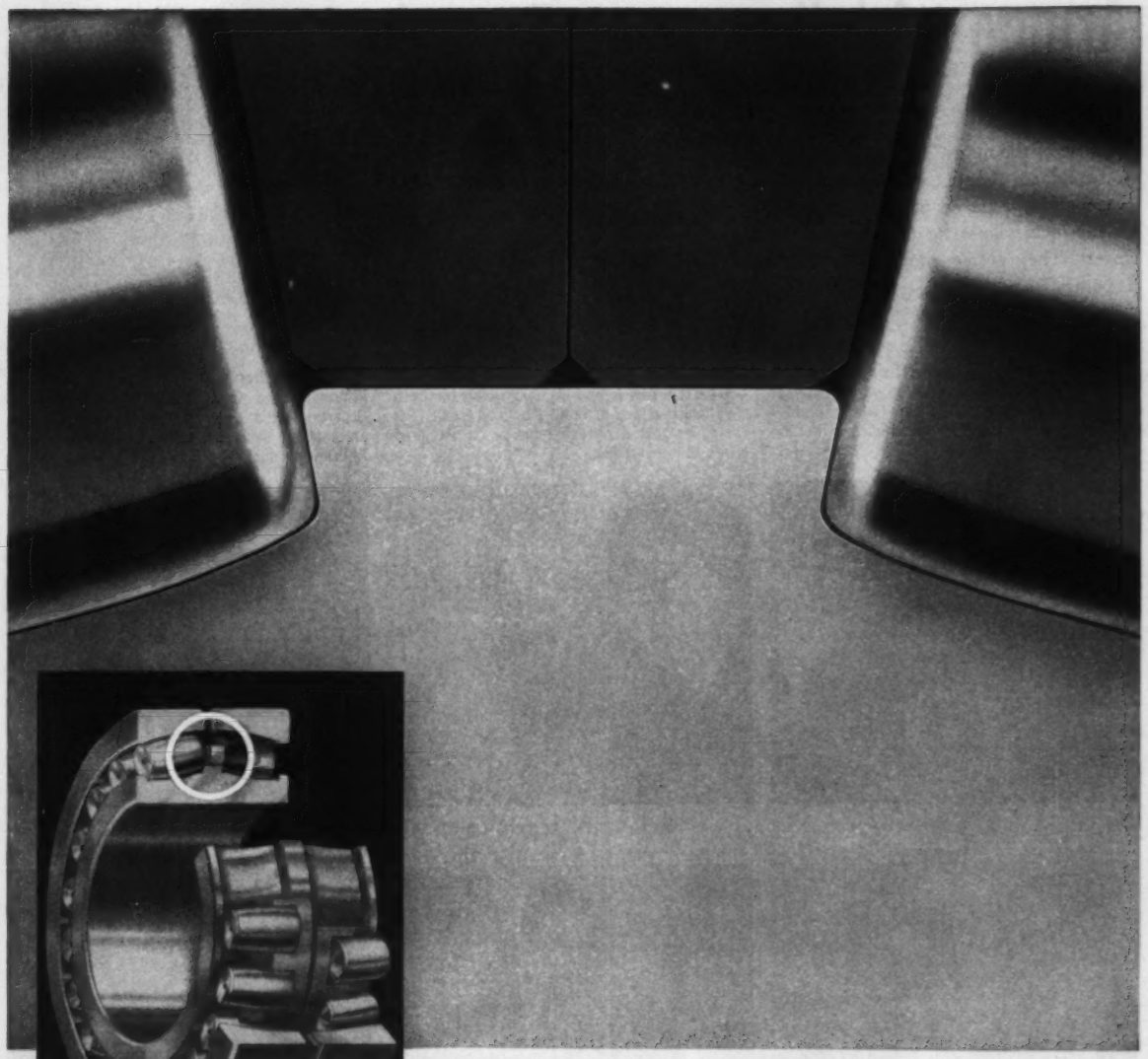
Society of the Plastics Industry is considering the preparation of a brochure to promote new uses for vinyl-metal laminates; the association has also developed a proposed commercial standard which it hopes the Commerce Department will adopt. Present uses for the laminates include auto interiors, air conditioners, wall panels, luggage, ice chests, table tops. Production totaled 12 million sq ft last year—14 per cent over the '58 total.

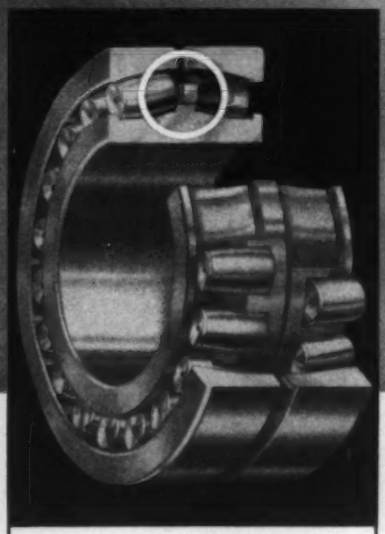
# Metalworking Pulse

**The Business Trend:** The decline in a number of business indicators is disconcerting, but most observers are confident 1960 will turn out all right. Cold weather continues to depress STEEL's index. **Autos:** Carmakers have again cut back production as stocks pile up, many dealers continuing snowbound. **Steel:** The latest ingot rate is the lowest since the week beginning Nov. 23 last year. Blamed are declines in automotive and general demand.

- **INDUSTRIAL PRODUCTION**
  - Week ended Mar. 19 . . 176†
  - Year ago . . . . . 169
  - Details on Page 69
- **PASSENGER CAR PRODUCTION**
  - Week ended Mar. 26 145,000*
  - Year ago . . . . . 121,832
  - Details on Page 66
- **INGOT PRODUCTION RATE**
  - Week ended Mar. 27 . 89.6%†
  - Week ago . . . . . 91.5%
  - Details on Page 120

†Preliminary. *Estimated.





**TORRINGTON**
**Spherical Roller Bearings Offer:**

- inherent self-alignment
- conformity of rollers to raceways
- integral center guide flange for stability
- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- even load distribution
- long, dependable service life

Send for new Torrington
Spherical Roller Bearing Catalog #258.

# *Keystone of Stability!*

The integral center guide flange of the *Torrington* Spherical Roller Bearing provides *positive* roller guidance—the one best way to insure operating stability under radial and thrust loads.

Center guide flange surfaces and roller ends are ground to a common spherical radius. The asymmetrical roller seeks this flange under load, bearing lightly but constantly against it. Roller wobble and skewing are eliminated, and stress concentrations leading to early failure are avoided. Bearing operation is cooler, quieter and smoother.

The integral guide flange is adapted from the same principle used in the design of Torrington Tapered Roller Bearings. It is an engineering refinement, based on experience in all types of applications, that insures outstanding performance in your equipment. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

## TORRINGTON BEARINGS

*Every Basic Type of Anti-friction Bearing*

**SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST**

# Armco "Ads" are not Born in Ivory Towers

Because of the many "ads" you see in the many magazines you read, we thought you might like to see how an advertisement is prepared at Armco Steel.

The men who write Armco advertisements are not sky-gazers. They get specific information from many sources. It comes from customers; from Armco salesmen, and from marketing and product specialists.

After an Armco advertisement is written, it must pass a "screening test." Depending on the subject matter, from five to fourteen specialists are required to review and approve the advertisement before it is released. Last on the list are Armco Research Engineers—the most critical of all.

**1.** Writer in Armco's own advertising department probes for information with an Armco market specialist. When possible they use a factual account of a customer's experience with one of Armco's special steels.

**2.** Next, writer confers with a product specialist—a person who keeps in touch with the technical aspects of a specific grade of steel. There, he gets a refresher-course on the properties of the grade . . .

**3.** . . . or writer may visit a customer for the information he needs. More often than not, he departs with a note pad full of information—facts about the performance of the steel in a finished product.

**4.** Back with his typewriter, the copy man goes to work. His ideas and the facts he has gathered are ready to jell. If all goes well, he may write an "ad" in a few hours; others, more complicated, may take much longer.

**5.** When satisfied with his effort, writer has script typed and gives the text to Armco's art director for layout. Supplies pictures—often gets better ideas for illustration from head of staff or one of his artists.

**6.** "Ad" O.K.? Far from it—it's just ready to "run the gauntlet." Research man is one of many reviewers required to check copy and layout, correct where necessary, and initial approval. Only then, "O.K. for Publication. . . ."

New steels are born at Armco

**This isn't the easiest way to "get out an ad," but we're sure it's the best way to give you helpful information you can rely on. Armco Steel Corporation, Middletown, Ohio.**

## ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

# Business Ethics a Must!

When a federal grand jury in Philadelphia indicted companies and individuals in the electric power equipment industry, it was a grim reminder that collusion in business is incompatible with our competitive, free enterprise system.

Among other things, the indictments charged: The fixing of prices and terms of sale, collusive bidding, allocation of business, and raising prices on components sold to other manufacturers with the intent to eliminate them from competition.

While the evidence and circumstances in the case are somewhat fuzzy, it appears that individuals involved acted without the knowledge of their superiors and contrary to company policy.

General Electric's Chairman Ralph J. Cordiner, for example, reacted swiftly by demoting several individuals, cutting their pay, and placing them in positions where they have no authority or responsibility for pricing.

As expressed by Mr. Cordiner: "Even if this were not a matter of law and business ethics, sound business judgment would argue against actions that restrict competition."

He noted that GE could only expect business which it rightfully earned from customers because of the quality of its products and its technical skills.

Earnings, he said, should depend upon technical accomplishments and competent selling effort . . . and that a business is certain to prosper only if it is conducted with a proper regard for the ethics the public has a right to expect.

We don't know whether the Philadelphia case and other actions, such as the small tool and drug cases, involve injustices, but we do believe that they point clearly to three things:

1. The Justice Department will not tolerate infractions of the antitrust laws.

2. Creative, aggressive competition and good business ethics are the keystones of industrial progress.

3. A company's reputation can be no better than the ethics of the people who work for it.

Irwin H. Such

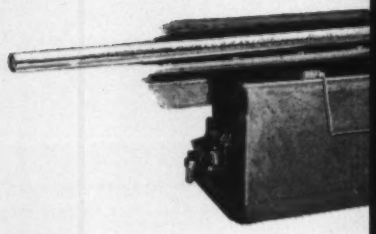
EDITOR-IN-CHIEF

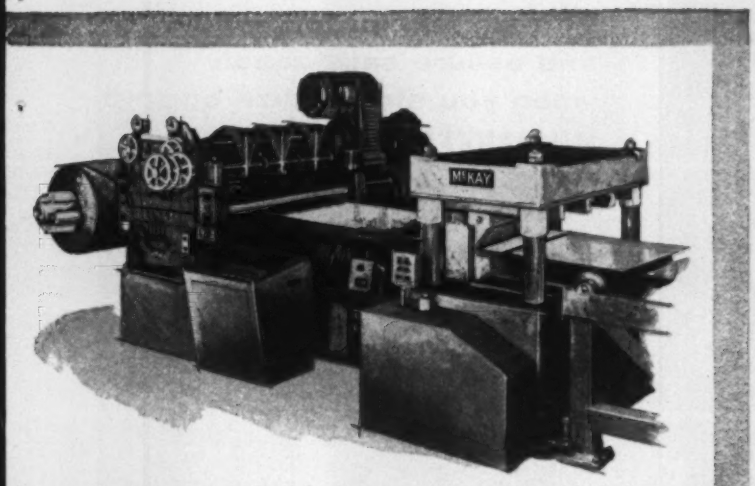
LOOK TO

# McKAY MACHINE

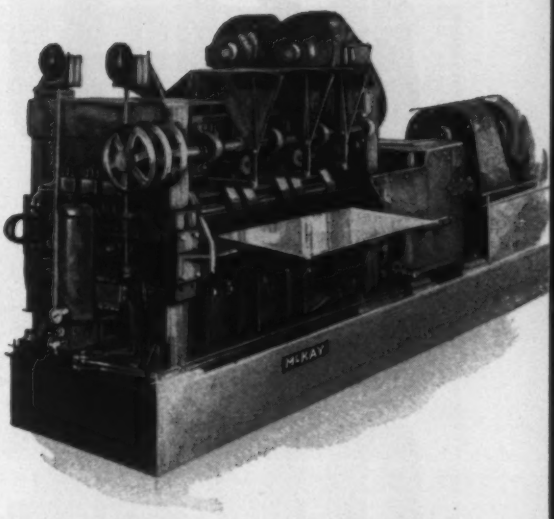
FOR PROGRESS IN METAL PROCESSING

McKAY PIPE MILLS






McKAYMATIC* DIE SHEAR LINES



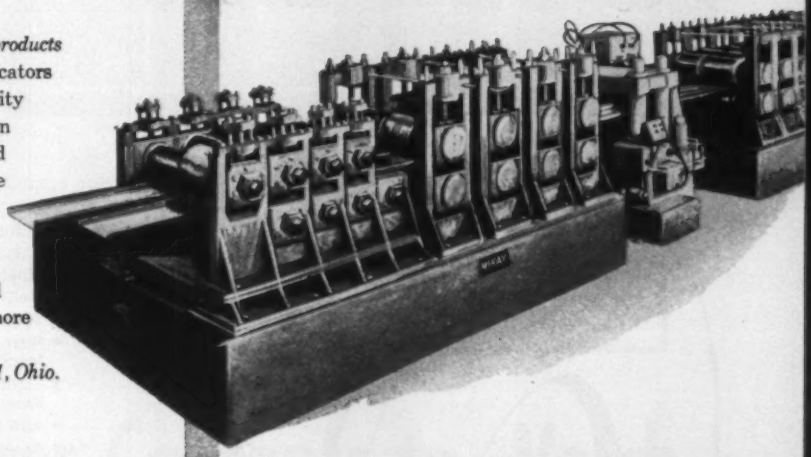

McKAY ROLLER LEVELERS

*No machine manufacturer puts more into its products than does McKay.* Metal producers and fabricators have learned they can expect and get integrity and honest value—the most advanced design and engineering—the finest construction and service—when they specify McKay Machine metal processing equipment.

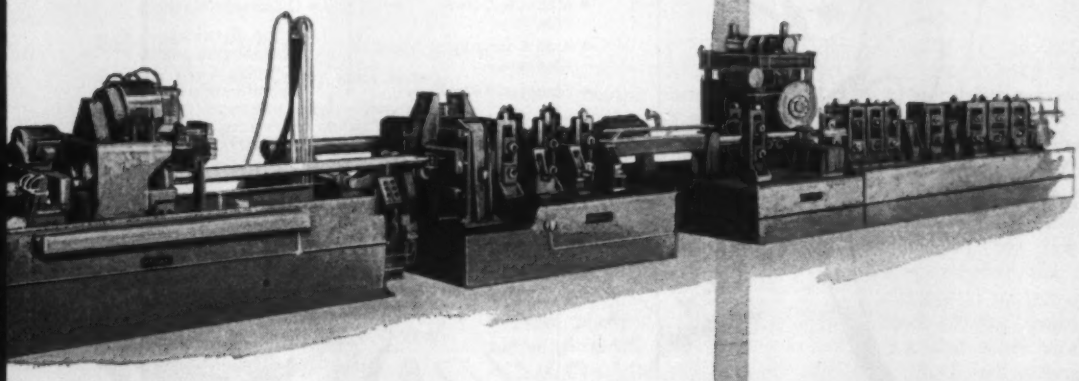
Look to McKay Machine in 1960 for more automatic machines, like those illustrated here, well conceived and skillfully developed to help you do your work faster, better and more economically than ever before.

*The McKay Machine Company, Youngstown 1, Ohio.*

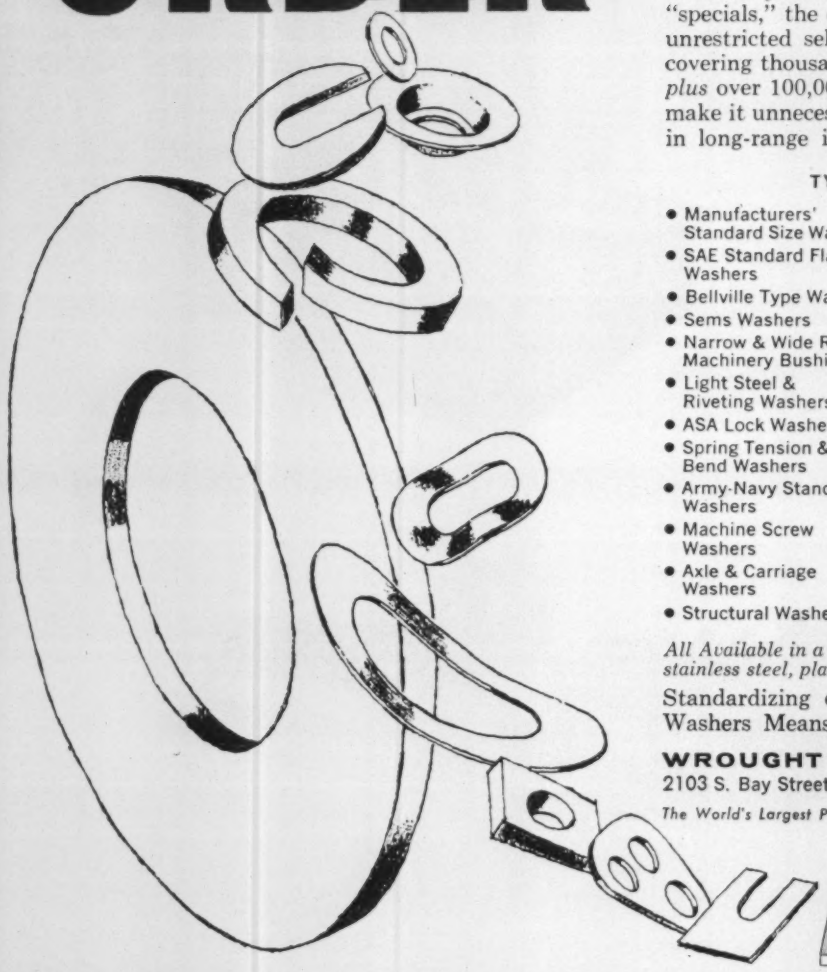
*TM




McKAYMATIC* FORMING MILLS



# ALL ON ONE ORDER



**You simplify procurement and assure satisfaction when you standardize on**

## MILWAUKEE WROT WASHERS

To get everything you need in washers — *on one order* — it pays to specify "Milwaukee Wrot" on every washer requisition you write.

One word tells the reason why: Specialization.

Milwaukee is the one prime source that has devoted more than 70 years to the volume production of quality washers. Special machinery — special production techniques — special facilities — special quality controls combine to make Milwaukee Wrot Washers the unmatched standard of superiority, the world over.

Whether your need is for "standards" or "specials," the complete Milwaukee line offers unrestricted selection. Factory stocks covering thousands of types and sizes, *plus* over 100,000 production-ready dies, make it unnecessary for you to tie up capital in long-range inventories.

**TYPES AVAILABLE**

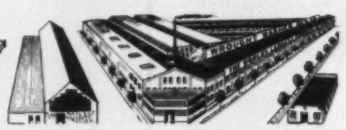
- Manufacturers' Standard Size Washers
- SAE Standard Flat Washers
- Bellville Type Washers
- Sems Washers
- Narrow & Wide Rim Machinery Bushings
- Light Steel & Riveting Washers
- ASA Lock Washers
- Spring Tension & Wave Bend Washers
- Army-Navy Standard Washers
- Machine Screw Washers
- Axle & Carriage Washers
- Structural Washers
- Countersunk Finishing Washers
- Flat & Bevel Square Washers
- Drawn Center Washers
- Bedspring & Mattress Washers
- Slotted & Split Rim Washers
- Expansion Plugs
- Cupped Washers
- Dished Washers
- D-Hole Washers
- D-Outside Washers
- Discs, Blanks & Special Designs to Virtually Any Specification

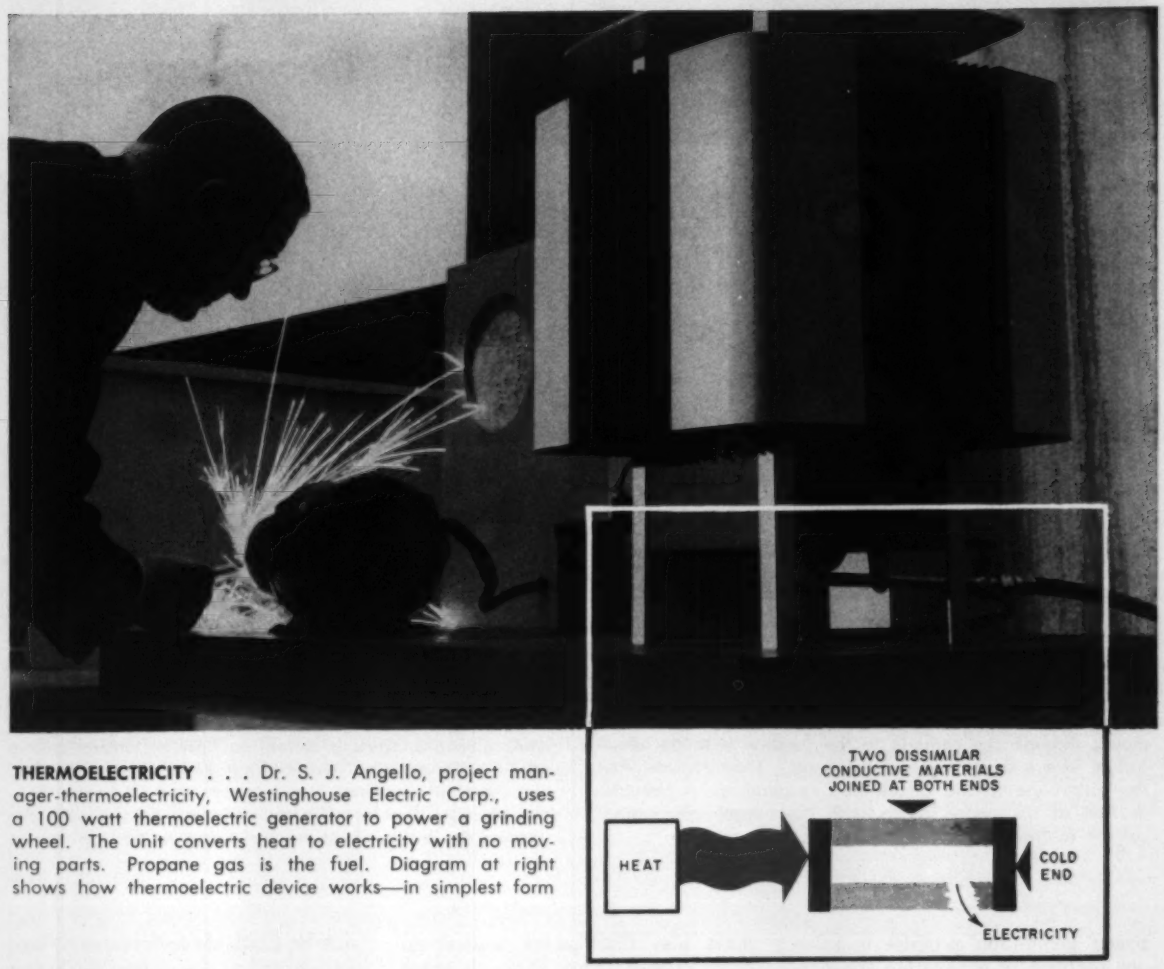
*All Available in a broad range of ferrous, non-ferrous, stainless steel, plastic and fibrous materials*

Standardizing on Milwaukee Wrought Washers Means Standardizing on Quality

**WROUGHT WASHER MFG. CO.**
2103 S. Bay Street • Milwaukee 7, Wisconsin
*The World's Largest Producer of Washers*

60-9718






**THERMOELECTRICITY** . . . Dr. S. J. Angello, project manager-thermoelectricity, Westinghouse Electric Corp., uses a 100 watt thermoelectric generator to power a grinding wheel. The unit converts heat to electricity with no moving parts. Propane gas is the fuel. Diagram at right shows how thermoelectric device works—in simplest form

# Four New Power Concepts to Watch

**BEFORE YEAREND, Westinghouse Electric Corp. will introduce a commercial, thermoelectric refrigerator, STEEL learned in an exclusive interview with a Westinghouse official. The small, drawerlike unit will be well suited for keeping ice. Westinghouse has completed several style drawings for household units.**

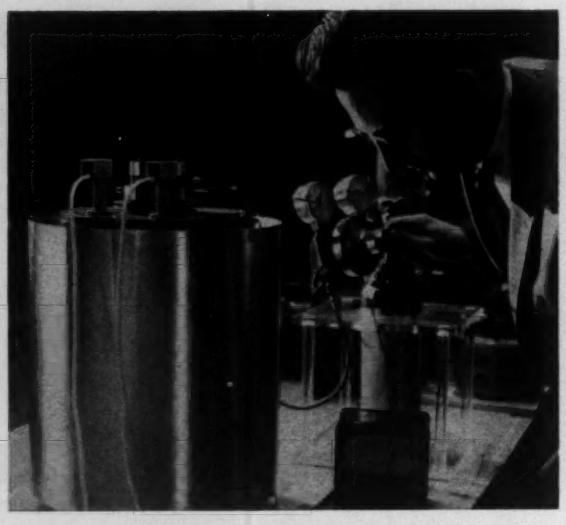
That is one of many potential uses for thermoelectricity. In that application, a thermoelectric device converts electricity into a cooling effect without moving parts.

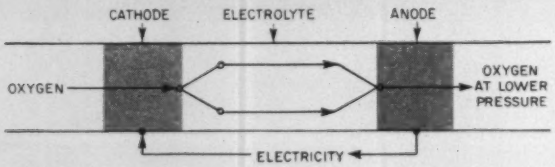
A like device converts heat directly into electricity.

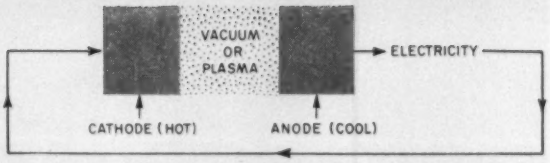
Watch the progress being made in thermoelectricity and three other new power sources—thermionic conversion, fuel cells, and magnetohydrodynamics (MHD). They offer metalworking:

- New markets. (Example: New metal alloys are needed.)
- New designs and processes. (Example: How do you package a powerhouse in a capsule?)
- More reliable power sources. (Example: You'll generate electricity without moving parts.)
- More efficient power generation—eventually.
- Electricity at remote locations—even on the moon. (A device like one of the four pictured in this article will probably be taken into space by our first astronaut. It may convert the sun's rays into electricity to power radio or TV, food storage units, air conditioning, and other vital equipment.)
- Much less maintenance and service.
- Longer lasting equipment.

The four new approaches to






**FUEL CELL** . . . Dr. R. J. Ruka, Westinghouse research scientist, shows a furnace in which a high temperature, experimental, fuel cell is being tested. An oxygen molecule moves through the cathode to the junction with the electrolyte where oxygen ions are formed. They migrate into the electrolyte to the anode and re-combine. A vacuum or fuel at the anode reacts with the oxygen, permitting current to flow

**THERMIONICS** . . . Dr. J. W. Coltman, manager of Westinghouse electronics and nuclear physics research, points to a cesium capsule in a thermionic tube. In the tube, a hot wire emits electrons, causing current to flow in ionized cesium gas. In the drawing, the hot cathode (a plate of conductive material containing free electrons and stationary positive charges) bubbles off electrons which pass through the vacuum (or a plasma of cesium vapor) to the cool anode

power generation promise to solve our problem of exhausting the natural resources needed for conventional production of electricity. "The new methods involve the conversion of less versatile, less controllable, less broadly useful forms of energy into electricity," explains S. W. Herwald, Westinghouse vice president-research.

• **Models Shown** — Westinghouse unveiled working models of each of the four systems for 200 top utility executives and members of the business press. Though the methods will first find more specialized applications, they are being developed for eventual large scale use.

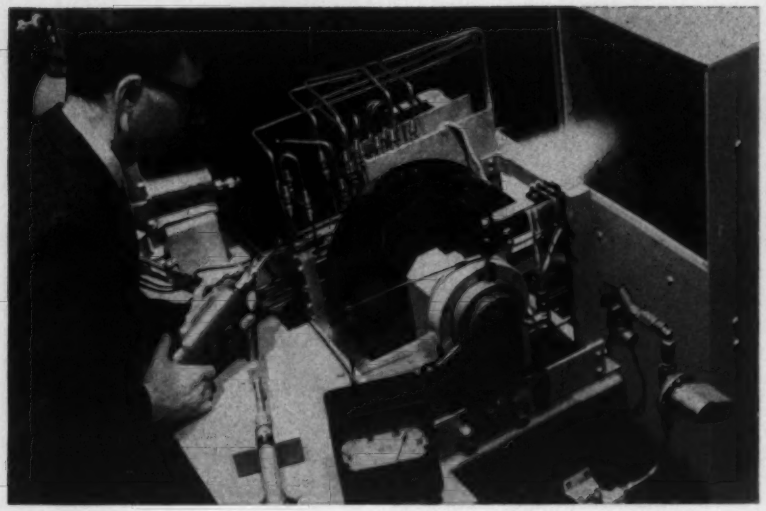
Mr. Herwald notes that, within the next 100 years, our supply of energy from conventional fuels (which account for 95 per cent of our needs) will be inadequate. So we must better exploit them. We must also find power sources to help conquer space. Though space applications won't soon add significantly to our use of energy, they raise a host of new problems, new challenges, and new boundaries within which the imagination can roam, points out Mr. Herwald. They can lead to efficient new ways to produce electricity for large scale industrial uses.

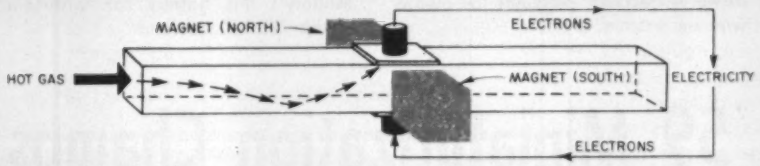
## Thermoelectricity

Progress in thermoelectricity is rapid. For example, a year ago, Westinghouse's best device produced little more than 1 watt of power; today it has 100 watt generators, is building a 5000 watt unit, and is planning a 1000 kilowatt plant for the mid-'60s. Today's materials have an inherent efficiency of only about 17 per cent; but Westinghouse's Dr. S. J. Angello predicts that materials with an efficiency of 30 per cent will be available in five years "and we see no reason to regard that as the ceiling."

Some efficiency is lost when the thermocouples are stacked in series to form a generator. For example, a material with an inherent efficiency of 17 per cent produces a generator with an efficiency of 6 per cent. That compares with 5 per cent for small conventional power supplies, 15 per cent for an auto engine, about 20 per cent for a large diesel engine, and about 42 per cent for large central station powerplants. It means that today's thermoelectric generators are competitive in applications up to about 10 hp.

But in contrast to conventional units, the efficiency of a thermoelectric generator is independent of size. And Dr. Angello believes that, by 1965, it will be possible to build thermoelectric generators with overall efficiencies of 20 per cent—






**MAGNETOHYDRODYNAMICS** . . . Dr. Werner Emmerich, Westinghouse research physicist, demonstrates a magnetohydrodynamic generator which produces 1 watt of electric power. In the drawing, hot ionized gas is blasted through a magnetic field at velocities up to 1100 mph. Electrodes are in contact with the gas stream. Electrons in the gas are deflected by the magnetic field and, between collisions with other particles in the gas, they move diagonally to an electrode. Electric current is produced as the electrons move from the anode, through the load, to the cathode, and back again to the gas stream

which would give the method many important applications in the 1000 kilowatt range.

• **Advantages**—Thermoelectric generators are rugged, compact, and free of moving parts. They're extremely reliable and will probably prove lower in capital cost than conventional equipment. Freedom from moving parts means quiet, maintenance-free, vibrationless operation.

• **Challenges** — Metalworking men with imagination can earn profit and prestige by tackling the design and market challenges of thermoelectricity. Potential uses are countless (see STEEL, Feb. 29, p. 57). But some major problems stand in the path of their realization. Take materials. The ideal thermoelectric material should have few free electrons but high electrical conductivity. And for large scale use, it must operate at high temperatures—perhaps around 2000° F. A promising step is the use of modified insulator materials.

And finding good materials is not the whole answer. They must be fabricated into thermocouples and assembled into working devices. For example, such assemblies must be joined so that contact resistance will be low and they must be shielded from the air. They must be mounted to withstand shock and vibration (Westinghouse has tried spring loading, for example). And weight must be reduced. One of Westinghouse's early generators weighed 50 lb, produced 100 watts. Power to weight ratio: 2 to 1. Westinghouse believes a 15 to 1 ratio is feasible.

## Thermionics

Materials development is also the key to making practical thermionic generators—a little explored area. An acceptable material must have a high heat of vaporization and a low work function; it must operate for long periods at temperatures up to 4500° F., notes Westinghouse's John Coltman.

• **What It Is**—A thermionic converter operates on the principle of the electron tube. As the cathode is heated, electrons bubble off and cross the vacuum to the anode. They then flow through the external circuit producing electric power (see diagram, Page 50).

Such a converter is compact, lightweight, simple, and promises high efficiency.

• **What's Needed** — The anode should have a high reflectivity for infrared radiation—to reduce radiation losses from the cathode. The operating temperature must be high.

## Fuel Cells

A fuel cell is an electrochemical device which converts the "free energy" of a chemical reaction directly to electrical energy. It consumes low cost fuel and an oxidant that are continuously fed into it. It contains no moving parts, can theoretically operate at 70 to 90 per cent efficiency (vs. 42 per cent for conventional powerplants). But at high loads, efficiency decreases.

"High temperature cells might become competitive with conventional large scale power sources in 10 to 20 years. Meanwhile, low temperature cells (below 450° F.) should find special uses where capital and fuel costs are not the primary considerations," reports Dr. R. J. Ruka.

Cheap fossil fuels can be used in cells that operate at high temperatures. But that poses severe demands for system components. They must be cheap, corrosion resistant for long periods at high temperatures, and retain useful conductivity. Fused salts, metal alloys, and special ceramics are being considered.

## Magnetohydrodynamics

A generator of this type uses a fluid conductor to produce an elec-

tric current. Hot ionized gas passes through a magnetic field to electrodes, and current is produced as the electrons move from the anode, through the load to the cathode, and back to the gas stream (see diagram, Page 51).

The possibility of practical generation hinges on the small overlap between the temperatures a few materials can withstand and the temperatures necessary to obtain adequate conductivity—around 4000 to 5000° F.

Near peak power, the efficiency of the generator may be as low as 50 per cent, but 80 to 90 per cent is possible when operating somewhat below maximum power, reports Dr. Stewart Way. He says the over-all efficiency of a magnetohydrodynamic plant might be 60 per cent (vs. the conventional 42).

• **Needed**—Materials must be developed to better withstand high temperatures, sudden temperature changes, and chemical action. New engineering and design approaches must be found to build durable parts of ceramic which have been made of metal, Dr. Way points out.

• **Forward Step**—Westinghouse has developed a generator of this type which has put out about 2.5 kw for 4 minutes at one-fourth maximum power rating. It burns furnace oil and oxygen.

• **Reverse Use**—Reversing the energy conversion process of a magnetohydrodynamic generator converts it into a propulsion system—which could conceivably drive a space ship farther than can a chemical rocket.

### Forecast

"These direct conversion systems . . . have the potential of reducing the cost of generating electrical energy," sums up Dr. J. A. Hutcheson, vice president-engineering.

Dr. Hutcheson points out that a saving of 0.1 cent per kilowatthour today would amount to a saving of $500 million annually in the U. S.

*• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

**David A. McLean examines his award winning printed circuit**

**Mallory's tiny battery can withstand environmental extremes**

# '59 Miniaturization Champs

A PRINTED CIRCUIT made by sputtering tantalum in fine and intricate patterns on a ceramic base won the 1959 Miniaturization Award. The entry was submitted by David A. McLean, component engineer, Bell Telephone Laboratories, Murray Hill, N. J. The thin film technique makes it possible to produce lines as narrow as 0.001 in. wide and 0.001 in. apart. The circuits will be used in computers and in communication instruments for missiles, satellites, and other airborne equipment.

Other entries which won certificates of excellence include:

Commercial production of a mercury battery 0.125 in. high and 0.300 in. in diameter; Mallory Battery Co., Cleveland, a division of P. R. Mallory & Co. Inc., and Ruben Laboratories, New Rochelle, N. Y.

The 1X-3 digital computer having a total volume of 0.12 cu ft; Eldon C. Hall, head, digital group, Instrumentation Laboratory, Massachusetts Institute of Technology, Cambridge, Mass., and Samuel A. Francis, partner, Francis Associates, Marion, Mass.

A 150 watt bulb ½ in. in diameter; Miniature Lamp Dept., General Electric Co., Cleveland.

A complete, four stage amplifier 0.531 in. in diameter and 0.228 in. high; Centralab, the electronics division of Globe Union Inc., Milwaukee.

A hydraulic cam motor 1 in. high and 1 in. in diameter, capable of developing 0.3 hp at 6000 rpm; Bendix Research Laboratories Div., Bendix Aviation Corp., Detroit.

Semiconductor solid circuit development through the use of single crystal semiconductor wafers; Jack S. Kilby, senior project engineer, Semiconductor Solid Circuit Dept., Semiconductor-Components Div., Texas Instruments Inc., Dallas.

## Chicago Expansion Doubles

Industrial development projects scheduled for the Chicago area in January and February were more than double the outlays in the same period last year. Projects worth $35 million have been announced by the Chicago Association of Commerce & Industry vs. $17.2 million in the corresponding 1959 period.

Of the 1960 spending, $26.5 million was announced in February. Reported projects include new construction or expansion of factories and industrial warehouses, as well as acquisition of land or buildings for industrial purposes.

# Metalworking Opportunities 'Down Under' Brighten . . . Capital Spending and Steel Output Head for Records

## How Aussies Woo Foreign Investors

- Low corporate and personal income taxes.
- No capital gains tax.
- No double taxation for U.S., U.K., and Canadian taxpayers.
- No restriction on remission of profits.
- Capital may be repatriated under special circumstances.
- Local capital participation in new enterprises is not compulsory.
- Franchise and licensing payments may be divided between services and royalties.
- Tariff protection available for industries requiring initial assistance.

AUSTRALIA has come up with a number of schemes (see above) it hopes will attract a flow of overseas capital. Reason: The Australian government sees a long period of capital shortage, reports the Stanford Research Institute, Menlo Park, Calif., in a recent study.

Despite the money pinch, Australian economists predict 1960 capital expenditures for the commonwealth's manufacturing projects will top the $451 million record set last year.

U. S. investments in Australia total around $750 million and are expected to reach $1 billion by the end of the year. About 200 manufacturers are subsidiaries or affiliates of U. S. organizations and 600 others have licensing or royalty agreements with U. S. companies. In addition to government inspired enticements, what's the big attraction down under?

Although not large by American standards, Australia is a rapidly growing market. The personal income of her 10 million inhabitants is second only to that in the U. S. and Canada. Over half the residents live in urban areas. Population growth has been the same as that in Canada (about 37 per cent in the last 15 years). Prediction for 1975: 13 million to 14 million Aussies. Consumer demand is seen rising 36 per cent by 1970. Big point: U. S. firms are said to have realized a ten year profit of 400 per cent on 1948 investments.

• **Industry Is Expanding**—Manufacturing jumped 40 per cent between 1953 and 1958. Gross national product increased from $6.1 billion in 1950 to $13 billion in 1958.

The steel industry upped production from 1.2 million ingot tons in 1949 to 3.1 million tons in 1958. Although output is running at a record annual rate of 3.5 million tons, the nation is experiencing a steel shortage. Increased domestic demand has forced Broken Hill Proprietary Ltd., Australia's largest steel producer, to withdraw from lucrative export markets. The country is relying on British and Japanese steel to supplement its needs. Authorities say steel output must be boosted by 5 million tons a year to meet domestic and export requirements.

As a result, Broken Hill is speeding its $125 million expansion program at Port Kembla and Newcastle, New South Wales. The firm has already spent $30 million for expansion in the last six months.

The Port Kembla facility, largest in Australia, is expected to turn out 2.3 million tons of steel this year. Projects to be completed during 1960 include a sinter plant, coke oven battery, open hearths, and a cold rolling mill.

• **Some Criticism of U. S.**—Despite the friendly air, there's still some ill will toward Yankees. Main target: General Motors' Holden Works, which captured 35 per cent of the commonwealth's car market in 1959. Labor Party leaders claim the country is being "bled white" by the drain of dollars back to the U. S. A change in government could yield legislation designed to favor Australian participation in overseas companies. However, observers are confident such a change could not occur for several years.

Other complaints concern duty and quota barriers against Australian goods shipped to the U. S. The blocks (mainly on agricultural commodities) include quotas on lead and zinc. J. J. McEwen, minister for trade, says: Despite the friendly relations between the two nations, no great world trading nation has obstructed Australia's battle for overseas trade in the last eight years more than the U. S.

His words are particularly meaningful since his country eliminated quota restrictions on 90 per cent of her imports last February. The action is expected to increase the value of imports to $2.2 billion annually. In 1958, Australia imported $1,775 million worth of goods. The value of exports was $1,885 million.

**TAKE 5 MINUTES TO READ THIS . . .**

**The business you save may be your own**

*Anderson Corp.'s Messrs. Arthur (left) and Anderson tell . . .*

# How to Rebuild a Company

FOR THE FIRST 27 years of its 31 year history, Anderson Corp. was near the bottom of its industry. In the last four, it has climbed dramatically toward the top. Main reason: Mechanization.

With 65 employees, it turned out sales under $500,000 in 1953; with 60, it accounted for nearly $1 million last year. Its volume will surpass $1 million in 1960.

The maker of power driven wire brushes, hand-scratch brushes, and hole cutting saws was taken over in October, 1955, by Brent R. Anderson. The president of the Worcester, Mass., firm now heads a management team whose average age is only 38. Other members: William C. Arthur Jr., vice president and treasurer; and Edmund E. St. George, controller and purchasing agent.

They came to a company whose equipment was obsolete, whose building was in disrepair, whose product was made from second grade material. They found fragmentary sales analysis reports, few cost records, and no work standards. Plant layout "bordered on the insane." Customer service consisted entirely of answering complaints.

The young managers launched a many sided improvement program. Its main features:

• **Mechanize**—The most important phase was (and still is) mechanization. Anderson has spent nearly $50,000 to develop and have an outside firm make a special production machine that will enable one man to do what three and a half do now. The company expects added volume to absorb all employees the new equipment displaces. It believes that even small firms must come up with special mechanization to thrive. But the specials have to be developed systematically with:

1. Product research to set optimum specifications.
2. Development of pilot models.
3. Estimates of total costs and payoff period.
4. Final design and construction of the machine.

Besides the attention to specials, Anderson is modernizing its conventional machinery and eliminating the need for some. It formerly had equipment to do its own stamping, heat treating, and packaging. Now it handles only special products and short run lots itself. Outside venders handle the balance, on contract.

• **Rearrange** — Plant layout was completely changed to eliminate much material handling. The managers found they could do their production in just a fraction of the space formerly required. That not only minimized lost motion but provided for future expansion.

The atmosphere of the old plant was transformed. Tons of junk were removed, including broken-down equipment, useless spare parts, and obsolete stock. The new equipment layout itself helped give order to the facility.

• **Motivate People**—The managers fell heir to a piecework system that was totally inequitable. In one case, three men on the same job had three different incentive rates. Time

studies were instituted with the help of a consulting engineer, and fair rates were set.

The fair rates alone produced a "substantial increase in efficiency."

• **Know Your Costs**—Early in the venture, the managers tackled the problem of cost knowledge. They weren't surprised to learn the old management had been selling 30 per cent of the line at a loss. All those items were mechanized for profit or dropped.

The managers' aim in cost information: Steadily improve its quality and quantity. They will be able to do that more readily now. Last October, they installed a Royal-McBee data processing system for inventory, sales analysis, and factory payroll.

• **Sell and Service**—Anderson sells mostly through manufacturer's agents servicing the industry through industrial distributors, specialty supply houses, and automotive distributors. The old management had six agencies deemed only fair; the new one has 18 good ones. Anderson plans eventually to hire several full-time regional managers to supervise the representatives.

Better production methods and inventory accounting now enables the managers to hit shipping promises on target a large percentage of the time. As soon as orders are received, they are entered and acknowledged, with a shipping date given.

• **Research and Develop** — Despite its size, Anderson is launching a research and development program. Some is done by one full-time man (more will be hired eventually), plus a consultant whose job is to devise radically new products and methods. Some, such as the equipment development program, is handled by outside firms.

R&D efforts will be directed mostly toward product development, and several innovations are in the works. Other R&D functions: Standardize on components; pick the best raw material (Anderson now uses prime quality only, in contrast to the lower grades once purchased).

*• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

## DIECASTING PRODUCTION

(In thousand pounds)

| | ZINC | | ALUMINUM | |
|---|---|---|---|---|
| | Custom | Captive | Custom | Captive |
| 1959 | 464,500 | 185,800 | 234,150 | 140,500 |
| 1958 | 340,000 | 164,000 | 193,500 | 96,750 |
| 1957 | 450,000 | 253,000 | 268,750 | 107,750 |
| 1955 | 550,000 | 270,000 | 270,000 | 82,500 |

Source: American Die Casting Institute.

# New Auto Uses Brighten Diecasters' Sales Outlook

DIECASTING business is on the upswing, although sales will fall short of original expectations. Most diecasters are predicting an 8 to 12 per cent increase over 1959 sales.

Last year, the auto industry, by far the industry's largest consumer, took 54 per cent (350 million lb) of all zinc diecastings produced and 45 per cent (170 million lb) of the aluminum diecasting output. Despite the slimmer outlook than first anticipated for auto production, the average use of diecastings per car is expected to rise. Each car took a record average of 30.39 lb of aluminum in 1959, up 1.39 lb from 1958. Previous high: 30.25 lb in 1957. Zinc diecastings used by automakers last year averaged 62.57 lb per unit, an increase of 0.56 lb over 1958, but below the peak of 75.74 lb used in 1956.

• **Trends**—This year, partly due to improved plating methods, it is believed that more zinc will be used in radiator grilles. More aluminum is seen going into transmission housings.

Much attention is being directed to nonautomotive markets such as home appliances, second largest user of both zinc and aluminum diecastings, and industrial and commercial machinery and tools, the third largest use category. Last year, a record 300.3 million lb of zinc diecastings went into those markets. Old record: 287 million lb in 1955. Aluminum diecastings totaled 204.65 million lb last year, surpassed only by the 211.25 million lb used in 1956.

• **Customs on Top**—There are about 1000 die shops in the U. S. More than 600 are custom shops which produce more tonnage than the captives (see table). However, there have been some shifts, with job shops strengthening their position in the zinc field while losing some ground in aluminum. The aluminum slide is ascribed in part to abnormal pressure exerted by 'round the clock deliveries under "hot metal" contracts which particularly prevail in the automotive industry.

In 1959, diecasting accounted for 99 per cent of the casting of zinc and 47 per cent of aluminum casting. The percentage of diecast magnesium (17.5 per cent) and copper (1.5 per cent) was small, but is holding even, with some indications of expansion.

# Export Aid Spurred by Deficit in International Payments . . . Export-Import Bank Outlines New Credit Guaranties

## Our Balance of Payments Problem

(Millions of dollars)

| U. S. DISBURSEMENTS ABROAD | 1959 | 1958 |
|---|---|---|
| Imports of goods and services | $23,474 | $20,951 |
| Net outflow of private capital | 2,145 | 2,844 |
| Government grants, excluding military | 1,623 | 1,611 |
| Outflow of government capital | 1,351 | 1,613 |
| Other | 777 | 707 |
| Totals | 29,370 | 27,726 |
| **U. S. RECEIPTS FROM ABROAD** | | |
| Exports of goods and services, excluding military | 23,337 | 23,199 |
| Repayments of U. S. government loans | 997 | 647 |
| Foreign long term investment in U. S. | 558 | 24 |
| Totals | 24,892 | 23,870 |
| **DEFICIT IN U. S. BALANCE OF PAYMENTS** (after adjustments for unrecorded transactions, U. S. gold sales or purchases, and increases or decreases in foreign dollar assets) | 3,702 | 3,415 |

ALTHOUGH our export-import ratio is improving, the pressure's still on to help domestic industry increase exports.

President Eisenhower has requested Congress to O.K. a series of steps to promote exports. He told the legislators: "Expanded exports can add substantially to the millions of jobs already generated for our people by export trade."

• **Ways and Means**—He promised that the State Department will continue work toward "the removal of unnecessary obstacles to international trade and payments." Healthier foreign countries can now remove such restrictions against U. S. exports through the General Agreement on Tariffs & Trade and the International Monetary Fund.

• **Export-Import Bank**—To help meet foreign competition, the Export-Import Bank announced "a new system of export guarantees covering political risks in short term transactions, where credits are not in excess of 180 days." The bank believes the arrangement will cover 90 per cent of the problems exporters face when dealing with countries where there is a risk of nontransferability or nonconvertibility of foreign currencies, losses from war, expropriation, and the imposition of import restrictions or the cancellation of import permits. The plan will go into operation within two months.

The Export-Import Bank will also expand its participation with commercial banks in medium term (one to five years) credits. Loans will be available when: 1. A commercial bank will finance the first three or four semiannual installments of a three to five year credit. (The Export-Import Bank will finance the rest.) 2. An exporter participates in each installment to the extent of 15 per cent of the invoice value and the commercial bank to the extent of 10 per cent without recourse on the exporter. (The Export-Import Bank will finance 55 per cent.) The foreign buyer must pay 20 per cent of the invoice value by the time of delivery. If he pays more, then the amount put up by the exporter or commercial bank may be reduced.

• **Government Services**—President Eisenhower plans several strengthening factors in ordinary government services to exporters. The Commerce Department's trade promotion and field office activities will be increased. Commercial activities of the Foreign Service Department will be given "higher priority." New overseas trade centers will be set up, and more government interest in international trade will be generated. He says all agencies will place special emphasis on reporting information of use to exporters.

• **Trend Indicator**—Commerce has just reported that our dominant role in Latin American markets is "weakening"—the best indication that action by the President, the Export-Import Bank, and other agencies must come quickly.

• **Balance of Payments**—Commerce reported the deficit in the U. S. balance of international payments was $3.7 billion last year, $300 million above the 1958 figure.

The deficit in our balance of payments reached a peak of $5 billion in the second quarter of 1959 and has been declining since. Commerce expects a continued decline in the deficit during the first part of 1960, but says: "Even with exports at December and January rates, they will not be sufficiently high to establish a reasonable balance in our foreign transactions."

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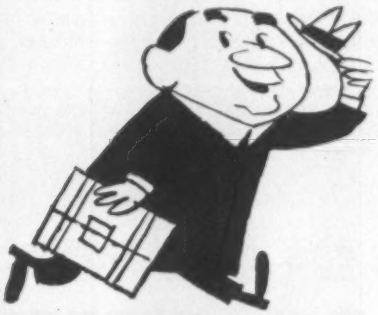

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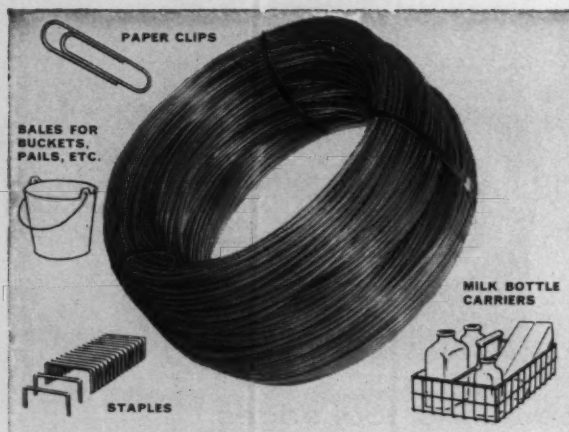


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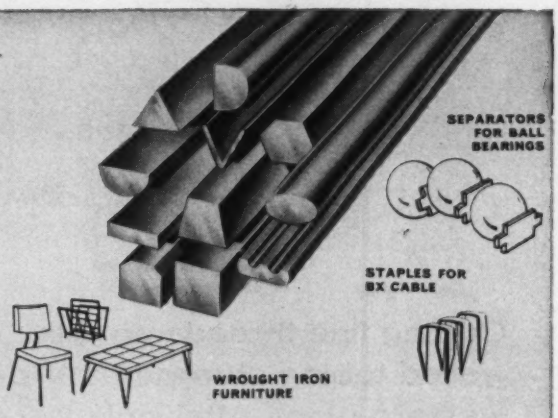


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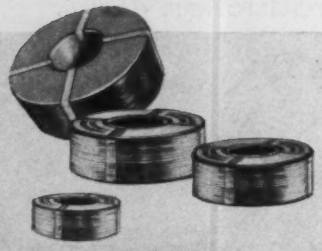

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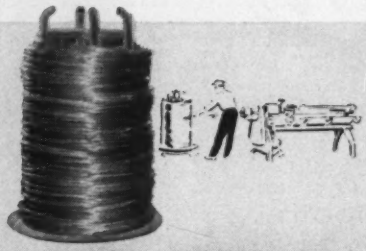

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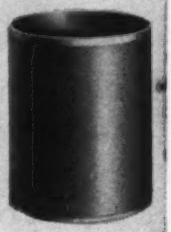

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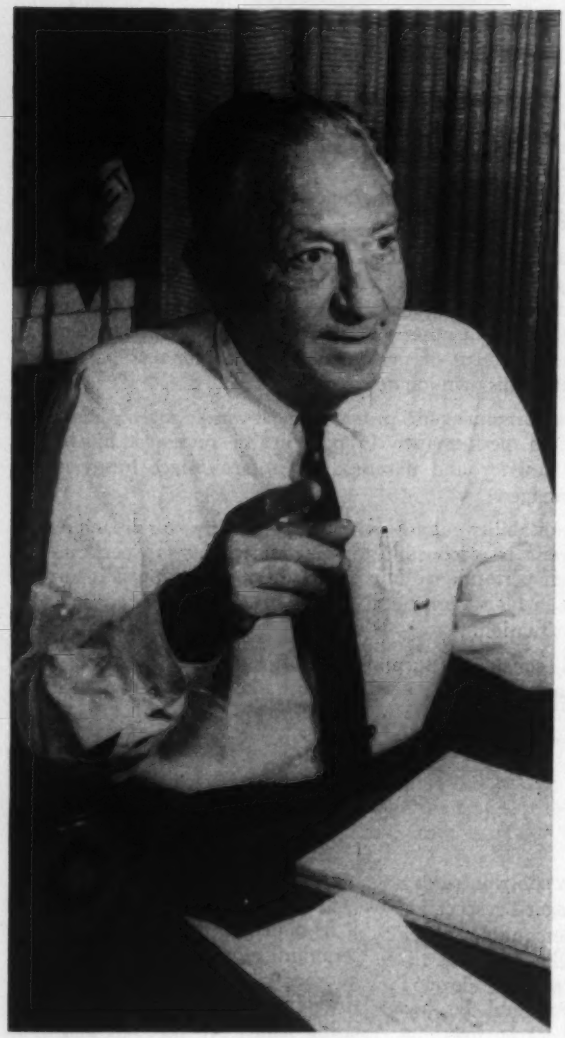

## Delegation: Key to Productivity

N. Harvey Collisson is a busy man who believes one measure of a senior manager's efficiency is how infrequently his telephone rings. Around his corporation, he's known as the man often tapped to get projects rolling and as a top level corporate "troubleshooter"—witness his many-hatted duties as president of Ormet Corp. (the nation's fourth largest aluminum producer), vice president of Olin Mathieson Chemical Corp., and general manager of its Metals Div.

His philosophy: Running today's metalworking operations is beyond the scope of any one man—unless he delegates. There has to be a proper delegation of responsibility all the way down the line including the delegation of authority to act. And there must be the closest kind of liaison and ease of communication between the different levels of management.

Once authority has been delegated, how can managers measure the effectiveness of subordinate managers? There are some obvious yardsticks, says Mr. Collisson, such as the physical productivity of the operation compared with a previously established par, the consistent failure to meet standards, planning that doesn't allow for delays or emergencies, and of course, the profit and loss statement.

Mr. Collisson also cites these . . .

### Not So Obvious Danger Signals

- **A safety record is going to pot.**
- **Grievances show slow but steady rise.**
- **Discontent among subordinates and friction with associates is reported.**
- **The manager isn't able to quickly grasp subject matter in which he is untrained.**
- **He demonstrates an inability to listen.**

# Boost the Boss's Productivity Too

MANAGEMENT productivity is a will-of-the-wisp, but it can be captured, channeled, and increased. How? By doing what the manager should do.

As Frank Thompson, consultant for McKinsey & Co. Inc., New York, puts it: The manager should spend more time in planning his function, in thinking more about his organization (people), and in evaluating how well he and his department are doing (measuring performance results). "He shouldn't have to spend his time putting out fires and taking care of details."

Suggests Mr. Thompson: Each manager should ask himself: What key things must we do to achieve maximum success? If we're already doing them, can we improve our methods? What's the best way of doing them? Is everything we're doing now necessary?

Setting of goals is the first step in management productivity.

Next, decide who's going to carry out the goals. Who is the logical man for each function? Are positions and duties going to overlap? Translate corporate objectives into the goals of your own operations for the benefit of the managers under you. Important: Set all those things down in writing.

Once you've decided what you want to do, and who's going to do it, the third step is to insure that what has been planned gets done, says Mr. Thompson. Tell each man what's expected of him and when. Demand progress reports to help

## How GE Manages Managers

"At General Electric, we try to take the same basic approaches to improving management productivity that we do for increasing efficiency of our hourly people," explains Harold F. Smiddy, vice president in charge of management consultation services. Here's GE's fourfold approach:

- Have predetermined goals for every job, even the president's. Each manager's job is clearly defined through a job description that details: 1. The nature of the position. 2. Its limitations. 3. Where it fits in with other jobs in the over-all picture. 4. Criteria for measurement of performance. The manager participates in writing his own job description.
- Measure performance in progressing toward goals. Each manager's job performance is periodically reviewed by his immediate superior and discussed in a face-to-face interview with the manager.
- Have accountability along with responsibility for reaching goals. Everyone is responsible to someone for his job performance. When performance falls short, the manager must report the reasons to his superior and tell what steps he has taken to correct the situation.
- Conduct a constant educational and training program for managers tailored to the needs of both the company and the individual.

measure performance. Keep a two way channel of communication open. Be flexible if an unusual situation comes up.

• **Freedom to All**—Create an atmosphere where freedom to act, to take risks, and to make decisions without fear of consequence is allowed, advises Robert King, president, Profit Counselors Inc., New York management consultants. He calls the "slavery of security" the biggest problem in U. S. business today. "Too often productive ideas leave a manager's head because of fear of failure. Management conformity dreads unproductive thinking and action."

But consistent failure to perform effectively should not be ignored. Robert Trundle, president of Trundle Consultants Inc., Cleveland, believes that perhaps managers should initiate a "get tough" attitude for chronic nonperformers, and demand superior performance on a "give it or else" basis.

Part of the problem has been created by the shortage of managers. Companies in many instances have been fearful of losing their middle managers. This has contributed to a decline in the manager's respect for his superiors. By demanding better performance, he believes, these individuals will be able to develop more job satisfaction and be less likely to job hop "because they disagree with management's policies." Managers have a basic responsibility to abide by and support decisions laid down by their superiors.

• **Efficiency Chiselers**—Be just as wary of efficiency chiselers that rob productivity as you are of the two legged kind. Some examples: Rigid protocol, unnecessary memos, antiquated procedures, fuzzy communications, verbosity, redundance.

As a company, you should be doing everything possible to increase manager productivity. Hupp Industries Inc. exposes all its key divisional and headquarters men to meetings of the board of directors—encourages their participation in a "no off-limits" session. Many companies sponsor improvement courses. Olin Mathieson has instituted a speed reading course (the average manager doubles his speed).

### Measuring the Manager

A manager is a trainer, leader, communicator, administrator. Or put another way, he gets results basically through the work of others by exercising leadership through planning, organizing, integrating, and measuring.

N. H. Collisson, president of Ormet Corp., believes an effective manager is one with the ability to direct and lead people (and to follow when necessary) and to communicate and delegate authority right down to the lowest supervisory level.

If those descriptions fit, how can performance be measured? It isn't easy and there's no single formula that will work universally. You need objectives, goals, job descriptions, some type of measurement yardstick, for each manager (see GE exhibit, above).

• **Danger Signals** — It's probably easier to measure managerial effectiveness from the negative rather than positive side. Keep a watch for these symptoms of poor manage-

ment productiveness, advises Mr. King (for other danger signals, see exhibit on Page 62):

- Poor labor relations.
- High personnel turnover.
- Shrinking profits.
- Poorly trained lower echelon managers.
- The manager who doesn't have time to see anyone.
- Poor morale.
- A tendency to blame internal and external factors.
- Loss of company position in relation to the industry.

### Causes of Low Productivity

With a little study, you can pinpoint the major managerial shortcomings in your own organization. Chances are they'll fall somewhere within the 13 most common ones listed on Page 62.

Probably the most common: Failure to delegate. Says one executive: "Most bosses do too much of their subordinates' work. And they not only keep their eyes on the work, they keep their hands on it too. If a manager is spending time on a subordinate's work, he's not giving enough time to his own duties."

"One problem," says Harold B. Schmidhauser, director of general management course, American Management Association, "is that many managers don't understand the difference between delegation and assignment. When you delegate, your subordinate decides how the job is to be done, sets up the lines of communication, and so on. When you assign, you tell someone what to do, when to do it, how to do it, and then follow up."

Hand in hand is the problem created by the manager who takes his old job "upstairs" with him

## Committees Can Boost Management Productivity

They can do so when utilized properly, believes Paul W. Robson, president and general manager, Wolverine Tube Div., Calumet & Hecla Inc. Here's his explanation:

### *The Theory . . .*

A management system works best when these two conditions are met: 1. Decisions are made at the job level. 2. Each manager uses the specialized talents of his subordinate managers in the decision making process.

### *The Approach . . .*

A system of management advisory committees that functions like this: The top committee at a division, for example, is the division advisory committee under the chairmanship of the divisional vice president. Members include plant managers and the directors of finance, purchasing, sales, operations, research, and industrial relations. Each of those men, in turn, is chairman of an advisory committee consisting of the managers who report to him. That sequence continues down the management ladder. Two controlling factors: Decisions reached in a committee session are made by and are the responsibility of the chairman. 2. Majority rule does not control.

### *The Execution . . .*

- **Individual committee objectives are clearly written and made known to all members.**
- **Committees are composed only of those people who report directly to the manager being advised.**
- **Committee functions are clearly detailed so time is not spent on matters outside its scope, inconsequential, or trivial. trivial.**
- **Agendas are circulated days in advance.**
- **Agenda responsibilities are assigned so each committee member knows what is expected of him.**
- **When a point of decision is reached, the chairman makes it. To help in reaching a decision, members are encouraged to comment on and evaluate all agenda items.**
- **Comprehensive minutes are prepared "for the record" and distributed to committee members and the next highest level of management.**
- **Frequency, time, and place of meetings (once selected) are followed without exception throughout the year.**

### *The Benefits . . .*

- **All managerial levels are kept better informed.**
- **Planning and execution are better when all departments have participated in decisions.**
- **Better informed managers mean day-to-day decisions will be sounder and made more promptly.**
- **A flow of new ideas and approaches that otherwise might not be available is tapped.**
- **Managers develop a greater and more personal identification with the whole organization.**
- **Managers with greatest potential are more readily identified.**

## Ten Most Common Shortcomings of Managers

- **Failure to train and develop management replacements.**
- **Inability to delegate responsibility and authority.**
- **Lack of orderly lines of communication.**
- **Timidity and buck passing in decision making.**
- **Lack of objectives and hazy understanding of duties.**
- **Nepotism and favoritism.**
- **Nine-to-fiveism—playing the game, not working the job.**
- **Wasting time on pseudo-business projects.**
- **Lack of competitive spirit.**
- **Blaming the government for all troubles.**

when he's promoted, or, as Harold F. Smiddy, vice president for management consultation services, General Electric Co., puts it: "When you get to be a major, don't do the captain's job."

• **Bitter Fruit** — Profit Counselors cites this example of what can happen when a manager violates that rule: A Midwest manufacturer doing $12 million yearly in a multiproduct line tapped the sales manager of its industrial products division to be the new vice president of sales. Within six months, the company's volume was down 15 per cent. As important: A serious morale problem was creating a turnover situation of some of the firm's best men. Reason: The new vice president was spending all his time and effort on the industrial sales division. The other two major divisions, accounting for 75 per cent of the company's volume, were being neglected. Final result: A new sales vice president, but it took the company quite a while to recoup.

McKinsey's Mr. Thompson cites other causes of managerial ineffectiveness:

- Decisions made without regard to alternatives, without taking time to clarify the problem, and for the sake of expediency rather than for what's best.
- Lack of a basic understanding of how to use financial data.
- Not sufficiently profit oriented.
- Shielding bad news from superiors. Not passing ideas up the line. Reporting only positives, minimizing negatives.
- Budget "padding" to keep the manager from looking "bad" in the eyes of his boss.
- Procrastination on firing marginal performers, particularly those on the management level.

### Cardinal Principle

In 600 B.C., the Chinese philosopher Lao-Tse summed up the cardinal principle of management productivity: "A leader is best when people barely know he exists, not so good when people obey and acclaim him, worst when they despise him."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

## Here's a Place To Buy an Idea

IDEAS, inventions, and new products destined to increase the gross national product will go on the auction block at a week long conference and exhibit this June. The event: The National Inventions Exhibition & Creativity Conference sponsored by the Cleveland Engineering Society, at the Cleveland Engineering & Scientific Center, June 20 through 24.

More than 150 models of inventions will be displayed. All will be patented or patentable, and most will be for sale, lease, or available for development.

The 80-year-old professional engineering society hopes the conference will promote invention, research, and business by getting inventors and researchers together with investors and industrialists. Featured will be five days of discussions and talks covering needs, creativity, research, and development—with special emphasis on what to do with an idea once you get it. The event is designed to show the value of ideas in today's economy.

## 7 Steel Foundries Prove Safety Can Be Perfect

Seven foundries proved last year that perfect safety records can be achieved. They won awards for completing a year's operation without a lost time injury in the Steel Founders' Society of America's first safety contest.

In commending the foundries for proving what could be done, the safety committee chairman, J. D. Holtzapple, Blaw-Knox Co., deplored the steel founders' accident frequency rate of 18 per million manhours worked compared with 5 for all of industry and 3 for steel mills.

Winning firms: Tonawanda Electric Steel Casting Corp., Hughes Tool Co., Calumet Steel Castings Corp., Eastern Malleable Iron Co., Blaw-Knox Co.'s Wheeling Works, Deemer Steel Casting Co., and American Cast Iron Pipe Co.

MAJOR REASONS FOR SPECIFYING NATIONAL ELECTRODES...

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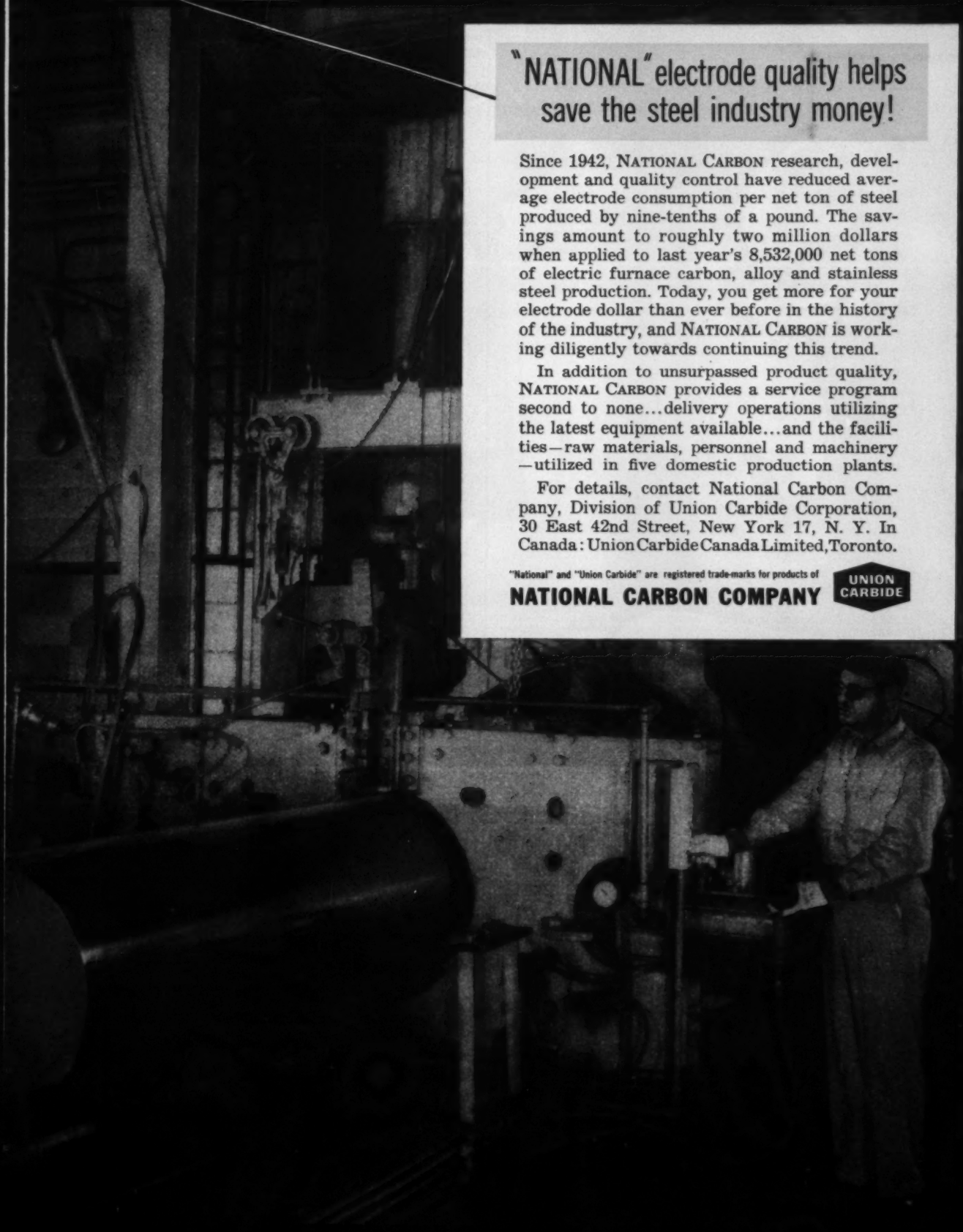

## "NATIONAL" electrode quality helps save the steel industry money!

Since 1942, NATIONAL CARBON research, development and quality control have reduced average electrode consumption per net ton of steel produced by nine-tenths of a pound. The savings amount to roughly two million dollars when applied to last year's 8,532,000 net tons of electric furnace carbon, alloy and stainless steel production. Today, you get more for your electrode dollar than ever before in the history of the industry, and NATIONAL CARBON is working diligently towards continuing this trend.

In addition to unsurpassed product quality, NATIONAL CARBON provides a service program second to none...delivery operations utilizing the latest equipment available...and the facilities—raw materials, personnel and machinery—utilized in five domestic production plants.

For details, contact National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Union Carbide Canada Limited, Toronto.

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UNION CARBIDE

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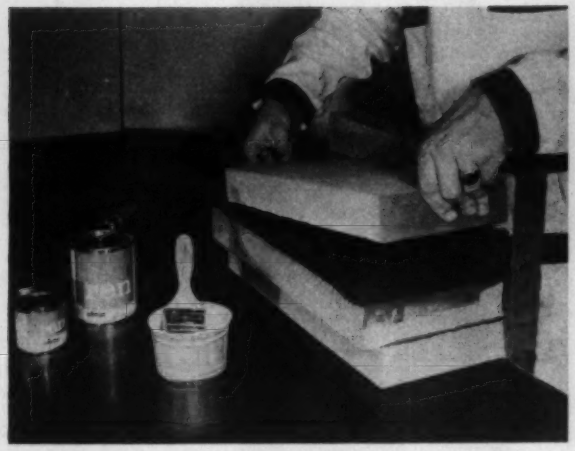
Need a larger shaft without disturbing envelope dimensions? Take advantage of a Hyatt option by omitting the inner race. You can add the thickness of the Hyatt inner race to the shaft and let the rollers operate directly on shaft. Just be sure that the shaft is suitably hardened and ground. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

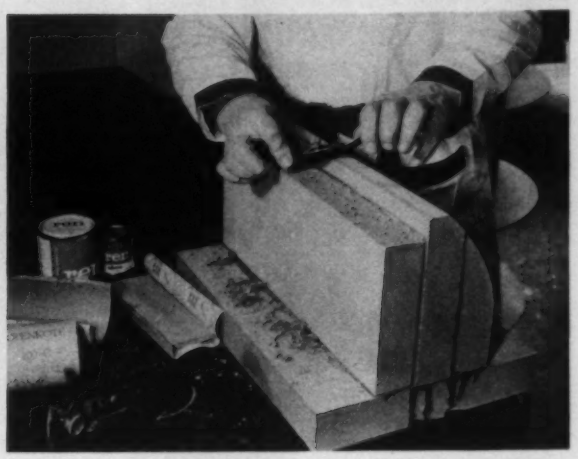
Replacement bearings available through United Motors System and its authorized bearing distributors.

# HYATT *HY-ROLL BEARINGS*

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM GENERAL MOTORS RELIABILITY



Ren Plastics is introducing a plank to replace mahogany for model building. Advantages claimed: No warpage, no grain imperfections, no knots



The 2 in. planks are bonded with a plastic adhesive. They can be carved, sawed, chiseled, planed, and shaped in the same manner as wood

# Plastics Vie for More Auto Jobs

PLASTICS are on the move again in autodom.

Creative Industries Inc., Detroit, says an epoxy paste is helping it to cut die model building costs 30 per cent. Ren Plastics Inc., Lansing, Mich., is introducing a plastic planking that can be used for model building. Chrysler Corp. is preparing to diecast a plastic interior part that will replace a 6 lb zinc casting.

As a result of such interest, there's more talk about another price cut in plastic materials to make them more competitive with nonferrous metals.

• **Cuts Costs**—The plastic tooling paste has enabled Creative Industries to institute a program for developing preliminary body surface tooling that's said to be 50 per cent faster and 30 per cent less costly than conventional procedures. The firm specializes in pattern and model work for automotive and aircraft firms. To remain competitive, the company has begun making plastic die patterns working directly from clay models. They are used to make hood, deck lid, and roof panel dies.

The process involves laying up an epoxy coating over the clay model. Then the skin is removed and reinforced with plastic paste. The result is a model that is dimensionally accurate. It can be cubed (cut into sections) and immediately made ready for further pattern working or diemaking operations.

The significance of the method is evident when you consider the time saved. Draftsmen normally spend hundreds of hours translating each sweep and curve of the stylists' clay models into drawing board figures and specifications so the clay can be accurately duplicated by a model builder. The epoxy paste can do the job because it is dimensionally stable and can be easily worked. If it is properly sealed, it won't absorb moisture. Shrinkage is only 0.003 in. per foot.

• **New Product**—The same type paste is used as an adhesive and fillet material for plastic planks that Ren Plastics is introducing. They are designed to take the place of mahogany in model building. (Other formulators of plastics also are working on wood substitutes.) Ren will show its product at the Detroit show of the American Society of Tool & Manufacturing Engineers, Apr. 21-28. Ford Motor Co., GM's Fisher Body Div., and Chrysler Corp. have already purchased sample footages to use in building models for 1962 and 1963 parts.

Harold Renaud, Ren's president, points out that the plastic planks offer controlled dimensional stability and says there's little waste. "Up to 10 to 20 per cent of the mahogany used for master models often has to be scrapped because of warpage and grain imperfections," he says. Plastic planks offer freedom from warpage, grain, and knots. Corner surfaces are especially hard to prevent chipping.

The plastic is comparable to mahogany in density. It may be carved, sawed, chiseled, planed, or shaped. With proper handling, it can be nailed and screwed. Under 100 per cent relative humidity at 100° F for 72 hours, the material

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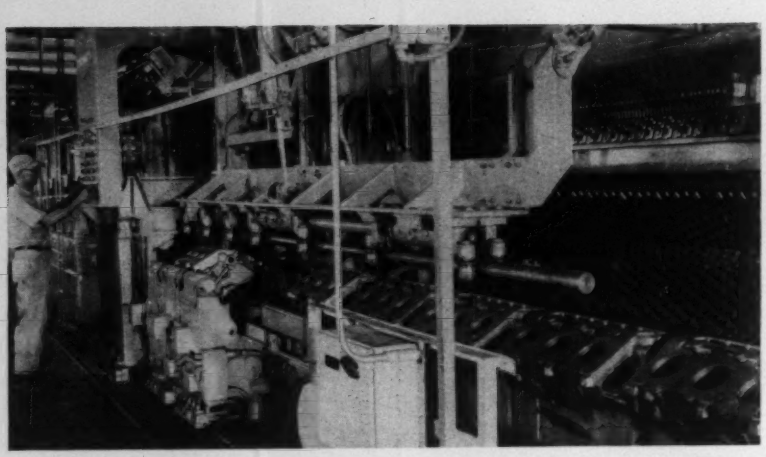

**THIS 100 TON BROACH** handles both V-6 and V-12 engine blocks at GMC Truck & Coach Div., Pontiac, Mich. The V-6s come in three different bores. The broach is part of GMC's new machining line that includes 267 machines. The V-6 requires 580 operations—540 are the same as those done on the V-12

shows a swelling of only 0.020 in. per foot in any direction.

• **New Part**—Chrysler is developing an interior plastic part weighing about 2 lb. It may appear on 1961 or 1962 cars, says Dr. E. J. Storfer, corporate staff engineer. The company already uses an average of 35 lb of plastic products in each of its cars. (The figure doesn't include such items as plastic seating fabrics or the small amounts of plastic compounds used in paints and other finishes.)

The part Dr. Storfer refers to is a zinc diecasting, but simple design changes will permit making the part in acetal resin. Thermal expansion coefficients and fastening methods are two of the more important considerations in redesigning parts from metals to plastics, he adds. Chrysler is interested in plastic parts because they are light and can have color and surface finishes (texture) cast into them. Even though the resins are still more expensive than zinc or aluminum, the automaker believes the elimination of finishing and coloring operations can make the final price competitive (see STEEL, Mar. 25, 1959, p. 107). Chrysler can't reveal what the part is, but E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., has displayed an instrument cluster housing cast from another plastic, Delrin, that fits the general description.

Dr. Storfer also points out that Chrysler uses epoxies for nonproduction tooling like master dies, die models, and initial production dies. Plastic jigs, fixtures, and gages are used where lightness is important and the tools are subjected to excessively rough handling.

Despite such advances, the use of plastics for production tooling is still limited. "I don't think anyone can accurately predict the production life of plastic dies today." asserts Dr. Storfer. Runs of 100,000 units for simple parts are considered excellent. Another problem—storage space for emergency dies which must be on hand when plastic tools are used.

Ultimately, the industry will be using more plastics at the expense of metals like zinc, aluminum, and magnesium, asserts Dr. Storfer. "We think that over the next few years the cost of metals will be rising, while the cost of plastics will be coming down. This means we'll be looking more and more closely at plastics for additional automotive applications," he says.

Du Pont has already cut the price of its plastics from year-ago levels. Example: Delrin is down to about 88 cents per pound. Its introductory price was $1. More cuts in prices of plastics are expected by summer.

As automakers gain experience with plastics, they're setting up standards for their use. Chrysler is in the process of formulating specifications, process sheets, and approved source lists for its designers and suppliers.

## Aluminum's Use Overseas

European carbuilders are using aluminum in many areas. Here's a brief report of what J. H. Dunn, automotive research director, Aluminum Co. of America, saw on a recent tour:

• Citroen is impact extruding aluminum bearings 1/4 in. thick. The alloy contains 6 per cent tin.

• Volkswagen is extruding bearings from an aluminum-zinc-lead alloy.

• Panhard has installed a five station merry-go-round casting line to produce an integral wheel and brake drum.

• Another European automaker uses graphite spray on pistons as a break-in materials instead of the commonly used tin immersion coating.

• Daimler-Benz puts all its aluminum castings through a shotblast chamber using aluminum shot.

• One producer has a forging line that's completely automatic from the insertion of the slug into a preheater through upsetting, forging, and heat treating.

## U. S. Auto Output

Passenger Only

| | 1960 | 1959 |
|---|---|---|
| January | 688,731 | 545,757 |
| February | 659,323 | 478,484 |
| 2 Mo. Totals | 1,345,054 | 1,024,241 |
| March | | 576,085 |
| April | | 578,825 |
| May | | 546,817 |
| June | | 557,994 |
| July | | 555,418 |
| August | | 239,152 |
| September | | 258,157 |
| October | | 507,530 |
| November | | 254,527 |
| December | | 494,931 |
| Total | | 5,593,677 |

| Week Ended | 1960 | 1959 |
|---|---|---|
| Feb. 20 | 158,898 | 120,780 |
| Feb. 27 | 153,501 | 127,783 |
| Mar. 5 | 138,513 | 133,540 |
| Mar. 12 | 145,967 | 134,283 |
| Mar. 19 | 147,930† | 135,466 |
| Mar. 26 | 145,000* | 121,832 |

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

PRODUCT INFORMATION

N/D sound booth for analysis of electric motor noise, mounted on springs and constructed with non-parallel walls, assures manufacturers a *scientific solution* to electric motor noise problems. Motors are tested with special electronic sound evaluation equipment.

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If you have an electric motor noise problem, contact the N/D Sales Engineer in your area. For additional information call or write New Departure Division, General Motors Corporation, Bristol, Connecticut.

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# How steel tubing saves weight in helicopter...in budget, too

Shown below is the main rotor shaft of a new model helicopter. Because it was hollowed out of solid steel bars to save weight, it was costly to make. After machining to thousandths of an inch accuracy, previously undetected steel flaws showed up. One out of every five parts had to be rejected.

Timken Company Metallurgists were consulted. After careful study, they recommended a special analysis of Timken® seamless steel tubing. Savings began immediately. Because the hole was already there, no drilling was required. Steel was saved. And with the extra advantage of uniform forged quality in Timken seamless tubing, rejects of finished parts were practically nil.

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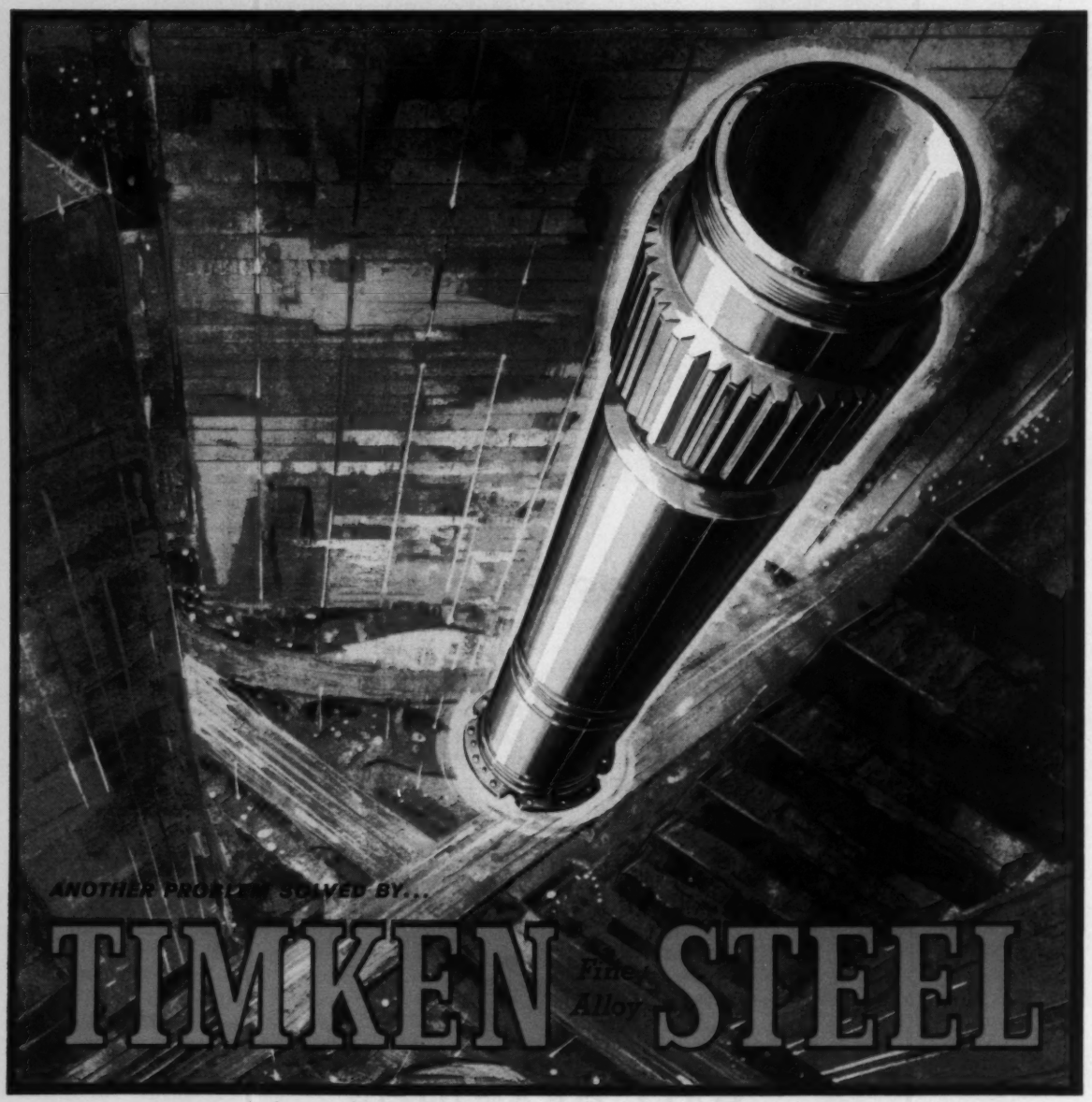
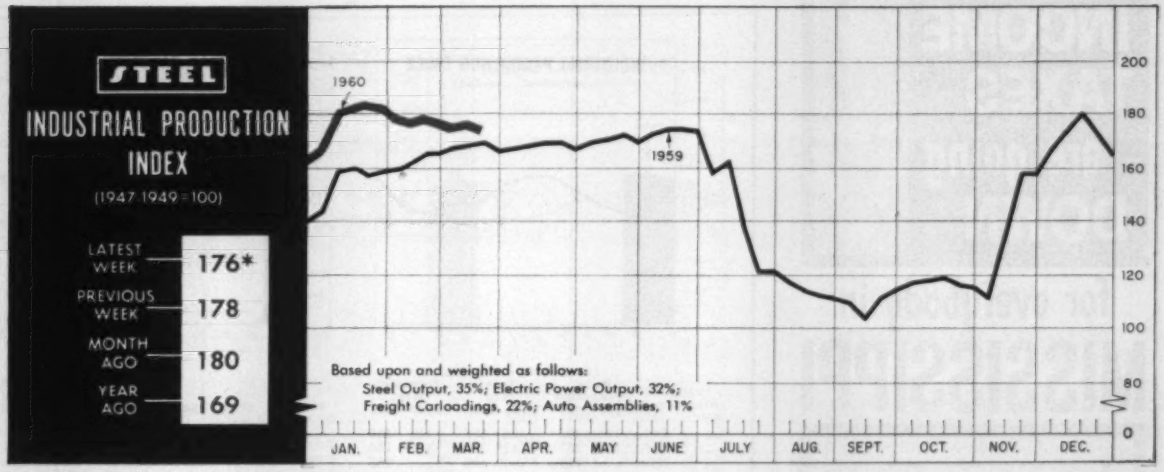



**TIMKEN ALLOY STEEL AND SEAMLESS STEEL TUBING ARE AVAILABLE FROM WAREHOUSE STOCKS IN 44 CITIES IN THE UNITED STATES**




*Week ended Mar. 19.

# Birth of Spring Upturn Is Near

THE ECONOMY is pregnant with possibilities. Like expectant fathers, many businessmen are sweating out the arrival of a healthy spring upturn.

Despite some disconcerting business news, most observers are confident that 1960 will turn out all right. Businessmen are planning near record outlays for plant and equipment; personal income is at an all-time high and still climbing; employment is setting monthly records; retail sales, though below the prestrike peak, are holding above year-ago levels; and better weather is just around the corner.

• **Weather Report**—Don't discount the effects that weather has had on March business. Many auto officials blame it for a sag in sales that started in late February. Farm machinery dealers can't sell their equipment in blizzard and flood areas. Retail merchants are convinced that record cold waves have been responsible for their poor showing. Snow and ice have also hampered the shipment of goods.

In fact, weather has been responsible to some degree for the decline in STEEL's industrial production index (above). Auto production has been cut back little by little as new car stocks have piled up in snowbound showrooms. Inventories of domestic cars passed the 1 million unit mark for the first time on Mar. 10, says *Ward's Automotive Reports*. While auto officials say it is a realistic level—in view of the many new models introduced this year—they feel they can't let them get much higher. Further cutbacks are possible until warmer weather arrives.

• **Frozen Switches**—Rain and snow have also been responsible for the unusually low level of railroad freight car shipments.

The record shows that they have been running between 30,000 and 40,000 cars a week under the year-ago figures for several weeks. And intercity truck tonnage has been

## BAROMETERS OF BUSINESS

| | LATEST PERIOD* | PRIOR WEEK | YEAR AGO |
|---|---|---|---|
| **INDUSTRY** | | | |
| Steel Ingot Production (1000 net tons)[2] | 2,554[1] | 2,607 | 2,631 |
| Electric Power Distributed (million kw-hr) | 14,050[1] | 14,271 | 12,900 |
| Bituminous Coal Output (1000 tons) | 7,755[1] | 7,600 | 7,800 |
| Crude Oil Production (daily avg—1000 bbl) | 7,000[1] | 7,049 | 7,203 |
| Construction Volume (*ENR*—millions) | $374.1 | $284.5 | $399.5 |
| Auto, Truck Output, U. S., Canada (*Ward's*) | 184,710[1] | 184,818 | 171,093 |
| **TRADE** | | | |
| Freight Carloadings (1000 Cars) | 580[1] | 560 | 603 |
| Intercity Truck Tonnage (changes from year ago) | +0.4% | −6.9% | +14.7% |
| Business Failures (Dun & Bradstreet) | 290 | 299 | 311 |
| Currency in Circulation (millions)[3] | $31,726 | $31,613 | $31,287 |
| Dept. Store Sales (changes from year ago)[3] | −6% | −17% | +9% |
| **FINANCE** | | | |
| Bank Clearings (Dun & Bradstreet, millions) | $26,452 | $22,378 | $26,589 |
| Federal Gross Debt (billions) | $290.4 | $290.5 | $284.5 |
| Bond Volume, NYSE (millions) | $25.3 | $33.1 | $33.6 |
| Stocks Sales, NYSE (thousands of shares) | 12,948 | 15,980 | 21,613 |
| Loans and Investments (billions)[4] | $102.2 | $102.7 | $103.7 |
| U. S. Govt. Obligations Held (billions)[4] | $25.1 | $25.4 | $33.2 |
| **PRICES** | | | |
| STEEL's Finished Steel Price Index[5] | 247.82 | 247.82 | 247.82 |
| STEEL's Nonferrous Metal Price Index[6] | 231.3 | 231.1 | 220.9 |
| All Commodities[7] | 119.7[1] | 119.7 | 119.4 |
| Commodities Other than Farm & Foods[7] | 128.5[1] | 128.5 | 127.8 |

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,844,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

INCOME TAXES are going DOWN

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- Top Income Tax bracket will be reduced 50%, graduated over a six-year period.
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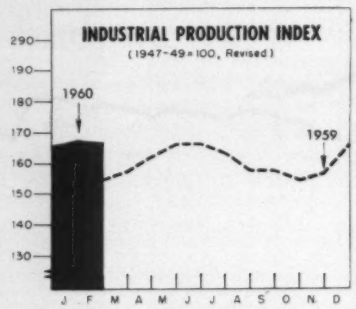
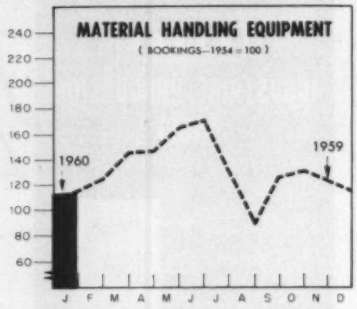
## THE BUSINESS TREND




(Seasonally adjusted)

| | Total Production | | Total Mfg. | | Durables Mfg. | |
|---|---|---|---|---|---|---|
| | 1960 | 1959 | 1960 | 1959 | 1960 | 1959 |
| Jan. | 168 | 152 | 169 | 150 | 181 | 156 |
| Feb. | 167* | 155 | 167* | 153 | 179* | 160 |
| Mar. | ... | 157 | ... | 156 | ... | 165 |
| Apr. | ... | 162 | ... | 161 | ... | 170 |
| May | ... | 166 | ... | 165 | ... | 177 |
| June | ... | 166 | ... | 166 | ... | 178 |
| July | ... | 163 | ... | 163 | ... | 171 |
| Aug. | ... | 157 | ... | 156 | ... | 158 |
| Sept. | ... | 157 | ... | 156 | ... | 157 |
| Oct. | ... | 154 | ... | 153 | ... | 155 |
| Nov. | ... | 155 | ... | 154 | ... | 155 |
| Dec. | ... | 165 | ... | 164 | ... | 174 |
| Avg | ... | 159 | ... | 158 | ... | 164 |

Federal Reserve Board. *Preliminary.
Charts copyright, 1960, STEEL.




| | 1960 | 1959 | 1958 | 1957 |
|---|---|---|---|---|
| Jan. | 114.96 | 115.84 | 93.07 | 126.34 |
| Feb. | ..... | 124.77 | 93.49 | 139.29 |
| Mar. | ..... | 146.36 | 97.89 | 140.76 |
| Apr. | ..... | 147.28 | 122.36 | 132.67 |
| May | ..... | 164.45 | 118.04 | 157.95 |
| June | ..... | 170.72 | 131.15 | 121.57 |
| July | ..... | 130.26 | 134.34 | 128.31 |
| Aug. | ..... | 87.02 | 104.46 | 110.09 |
| Sept. | ..... | 126.43 | 85.41 | 116.79 |
| Oct. | ..... | 131.09 | 111.35 | 124.80 |
| Nov. | ..... | 124.16 | 110.88 | 87.80 |
| Dec. | ..... | 113.78 | 105.97 | 105.65 |
| Avg | ..... | 131.85 | 109.87 | 124.34 |

Material Handling Institute Inc.

well off the pace of earlier figures. It's a cinch that there is bound to be an upsurge sooner or later.

Shippers in the Allegheny Region (covering parts of Pennsylvania, Ohio, West Virginia, and Maryland) gave some idea of what is coming when they predicted that carload freight shipments in the area during the second quarter would rise 4.1 per cent above those of the corresponding 1959 period.

Indirectly, weather has also cut into steel production. Slow sales of cars and appliances, plus reduced construction activity in many parts of the country, have reduced steel consumption. With inventories at a comfortable level, there has been little pressure on the mills for delivery. Last week, steelmakers cut production again, operating at 89.6 per cent of capacity, good for 2,554,000 net tons of ingots.

• **Effect on Index**—The net result is a decline of 2 points in STEEL's index to a preliminary 176 (1947-49=100) for the week ended Mar. 19. This is at least 2 points under the level that could be expected if the weather were more springlike.

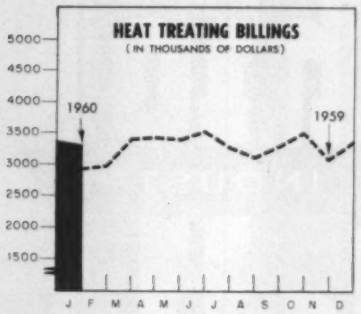
But don't expect the trend line to shoot back up at the first sign of the crocuses. It will take time. And the big push probably won't come until well into April. Then the opening of the Great Lakes navigational season and the traditional spring push in autos will add zest to business.

### Looks at Brighter Side

Many businessmen are overlooking some of the brighter aspects of the economy today because of their preoccupation with the seamier side of the news, declares Fred O. Kiel, senior economist for the Federal Reserve Bank of Cleveland. He lists three developments, which he feels "should contribute to the confidence of businessmen as to the sustainability of a period of high level business activity in the months ahead rather than to generate fears as to the future."

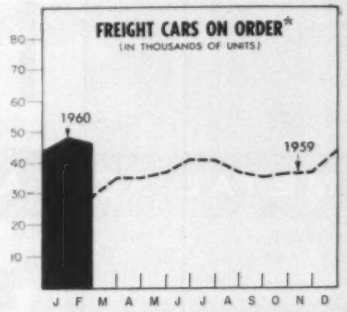
Concerning the stock market decline, Mr. Kiel says: "Some correction in stock prices was overdue. . . . Thus it is entirely possible that the stock market is not now forecasting a business change for the worst."

Secondly, he feels that the rapid rise in auto stocks may be "a sign of impending strength in sales rather than evidence of weakness in the automobile industry. . . . The




| | 1960 | 1959 | 1958 |
|---|---|---|---|
| Jan. | 3,297.0 | 2,769.1 | 2,825.5 |
| Feb. | 2,976.0 | 2,466.3 | |
| Mar. | 3,397.3 | 2,490.5 | |
| Apr. | 3,420.6 | 2,538.0 | |
| May | 3,405.6 | 2,421.5 | |
| June | 3,518.5 | 2,367.3 | |
| July | 3,259.7 | 2,141.5 | |
| Aug. | 3,111.3 | 2,212.9 | |
| Sept. | 3,285.7 | 2,456.9 | |
| Oct. | 3,509.8 | 2,754.3 | |
| Nov. | 3,079.5 | 2,404.8 | |
| Dec. | 3,349.9 | 2,765.5 | |

Metal Treating Institute.




| | Domestic Awards | | Backlogs (end of month) | |
|---|---|---|---|---|
| | 1960 | 1959 | 1960 | 1959 |
| Jan. | 7,149 | 4,102 | 48,170 | 29,470 |
| Feb. | 3,411 | 1,842 | 46,323 | 28,789 |
| Mar. | | 10,782 | | 35,487 |
| Apr. | | 3,735 | | 35,479 |
| May | | 5,203 | | 36,869 |
| June | | 8,369 | | 40,973 |
| July | | 4,159 | | 40,309 |
| Aug. | | 1,653 | | 37,172 |
| Sept. | | 943 | | 35,626 |
| Oct. | | 2,722 | | 36,199 |
| Nov. | | 2,424 | | 36,555 |
| Dec. | | 10,560 | | 43,870 |
| Total | | 56,494 | | |

*Domestic only.
American Railway Car Institute.

multiplicity of offerings to the public requires a much larger inventory than heretofore necessary to achieve maximum sales volume in all price lines."

Finally, he feels that the current downtrend in steel production "implies a steadier rate of steel mill activity and employment opportunities in the second half of the year and beyond."

### Consumer Buying Key Factor

One of the key elements in the anticipated spring upturn is the likelihood of increased consumer spending. Retail sales have been acceptable, but like many other areas of the economy, they have not come up to expectations. The lag following the steel strike has some observers worried.

But James M. Dawson, vice president and economist of the National City Bank of Cleveland, points out that "a somewhat similar lull followed the three previous postwar steel strikes. . . . This time the dip in sales has been more prolonged and a little deeper, but then this recent strike also was more severe.

"If sales were to resume their pre-strike relationship to income, it would represent a 3 per cent improvement. An advance of that magnitude would amount to about $6 billion on an annual basis—enough to just about offset the prospective decline in the rate of inventory accumulation."

Mr. Dawson suggests that historical patterns give hope that the advance is imminent.

Personal income has risen steadily since last August when it hit a strike period low of $390 billion (annual rate, seasonally adjusted). At February's $393 billion, it was $22 billion above the year-ago level. And keep in mind that all the opinion polls conducted in the last year indicate the consumer is in a buying mood.

## FRB Index to Advance

Even the announcement of a 1 point decline in the Federal Reserve Board's industrial production index for February (see graph and table, Page 70) couldn't dampen the optimism of a group of ten bank and industrial economists last week. Polled on their predictions for the quarterly average of the index for the rest of the year, the median was: First quarter, 167; second quarter, 168; third quarter, 168, fourth quarter, 170.

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- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Double-Pour Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls

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*Parker Rust Proof v. p.*

BEN FLES
*Conco Eng. div. sales*

ADOLPHE S. KROMER
*heads Flexonics*

LORING S. BROCK
*U. S. Steel div. exec.*

**E. B. Thompson**, general sales manager, was elected a vice president of **Parker Rust Proof Co.**, Detroit.

**Ben Fles** was appointed sales manager, Material Handling Div., **Conco Engineering Works**, Mendota, Ill. He was with Manning, Maxwell & Moore Inc. as manager, Special Contracts Div.

**James N. Heald II** was named to the new post of manager-domestic distributor sales, **Heald Machine Co.**, Worcester, Mass.

**C. Rhoades MacBride** and **W. P. Gullander** were made executive vice presidents of **General Dynamics Corp.**, New York, effective Apr. 1.

**J. David Hopkins** was elected vice president-sales, **Delavan Mfg. Co.**, West Des Moines, Iowa. He was general sales manager.

**Thracy Petrides** was appointed director of government programs of **U. S. Industries Inc.**, New York.

**William C. Coburn** was promoted to vice president and general manager of operations for all plants of **Martin Steel Corp.**, Mansfield, Ohio. He was vice president, Airframe & Weldments Div. **Harold D. Youngberg** was made Midwestern regional sales manager; **Earl B. Wilkinson** Northeast regional sales manager.

**George Rouvalis** was appointed manager, **J. M. Hopwood Laboratory**, newly completed No. 2 research center of Hagan Chemicals & Controls Inc.

**Adolphe S. Kromer** was elected president and general manager, **Flexonics Corp.**, Chicago, subsidiary of Calumet & Hecla Inc. He was vice president-general manager of C&H's Calumet Div., Calumet, Mich.

**H. B. Scott** was made purchasing manager, **Sparton Electronics Div.**, Sparton Corp., Jackson, Mich. Formerly a buyer in the Purchasing Dept., he succeeds **Arthur G. Lee**, retired.

**Alvin B. Goodspeed**, director of contracts for **AC Spark Plug Div.**, Milwaukee, General Motors Corp., was promoted to director of sales. He succeeds **Moreton B. Price**, promoted to director of sales, Defense Systems Div., Washington.

**Malcolm F. Bell** was made central sales manager, **American Pulley Co.**, Philadelphia.

**John R. Caulk Jr.** was elected president, **Hussmann Refrigerator Co.**, St. Louis. He was executive vice president.

At the Middletown, Ohio, Works of **Armco Steel Corp.**, **Donald C. Osborne** was named assistant general superintendent - maintenance and services. He succeeds **Robert S. Hayes**, retired. **Fred E. Gerber** succeeds **Carl W. Martin**, retired, as superintendent of cold reduction finishing. **Delbert S. Mann** was made superintendent-East Processing Dept.; **Eli Komnenovich** superintendent of coating, stainless, and finishing. **Forrest M. Morrow** was made assistant general superintendent-rolling and processing.

**Loring S. Brock** was named executive vice president, **U. S. Steel Products Div.**, Pittsburgh, U. S. Steel Corp. He was manager of structural and plate products.

**Donald J. Anzells** was made plant manager, **Hillwood Mfg. Co.**, Cleveland. He was quality control engineer for Forest City Foundries Co.

**Richard H. Wheeler** was made vice president - manufacturing, **Warner Automotive Div.**, Auburn, Ind., Borg-Warner Corp. He was works manager at Tulsa, Okla., for Black, Sivalls & Bryson Inc.

**James A. Burt** was made manager of railroad sales for **Aluminum Co. of America**, Pittsburgh.

**John P. Foran** was elected president and treasurer, **W. T. Lane & Bros. Inc.**, Poughkeepsie, N. Y. Former executive vice president and general manager, he succeeds **William L. Carroll**, elected chairman.

**L. L. Williams** was elected a vice president, **Armco Drainage & Metal Products Inc.**, subsidiary of Armco Steel Corp., Middletown, Ohio. He continues as manager of the Dixie Div., Atlanta.

**Sheldon D. Johnson Jr.** was made manager of quality control, Columbus, Ohio, plant, **American-Standard Industrial Div.**, American Radiator & Standard Sanitary Corp.

**John J. Kilcoyne** was named superintendent of the weaving mill, Palmer, Mass., plant, **Wickwire Spencer Steel Div.**, Colorado Fuel

J. F. MURRAY THOMAS D. CARPENTER LOUIS J. SCHAFER

*Pesco Products engineering positions*

& Iron Corp. **Gerald Roinestad** was made assistant superintendent.

In the Engineering Dept., **Pesco Products Div.**, Bedford, Ohio, Borg-Warner Corp., **J. F. Murray** was made director of engineering; **Thomas D. Carpenter** manager, future product planning; **Louis J. Schafer** project manager. **Thor Holm** was made manager, engineering design; **Albert Paul** supervisor of design.

**Lewis A. Dibble Jr.** was elected executive vice president, **Risdon Mfg. Co.**, Naugatuck, Conn. **Lawrence F. Heileman, Edward Noyack,** and **Donald S. Tuttle** were elected vice presidents. **Earl F. Copp,** vice president, retired to become special consultant to the company.

**Roland J. Fernekes** was made manager of manufacturing engineering, **Landers, Frary & Clark,** New Britain, Conn., and its subsidiaries. **Leland C. Sharron** was named to the Manufacturing Engineering Div. to co-ordinate toolmaking and tool designing for the company. Mr. Fernekes was chief product engineer for Midland-Ross Corp. Mr. Sharron was plant superintendent for Aladdin Tool & Die Co.

**Gordan Campbell** joined **J. F. Quest Mfg. Co.,** Minneapolis, as foundry superintendent. He was foundry and machine shop manager, St. Paul Foundry & Mfg. Co.

**Howard F. Lewis** was elected vice president, **Greenlee Foundries Inc.,** Chicago. He was vice president of Woodruff & Edwards Inc.

**H. S. Caufield** was named to the new post of superintendent of inspection and steel conditioning at the Gadsden, Ala., plant of **Republic Steel Corp.**

**George D. Becker** was named general manager, Heating & Air Conditioning Div., **Controls Co. of America,** in addition to his corporate duties as vice president-operations. The division is located in Milwaukee, but Mr. Becker remains at Schiller Park, Ill., headquarters. **Donald M. Strathearn,** Controls Co. vice president, was promoted to general manager, Appliance & Automotive Div., Schiller Park. He is succeeded by **John A. Kovas** as director of sales for that division.

**Robert Penovich** was made assistant superintendent, **Union Drawn Steel Div.** plant, Massillon, Ohio, Republic Steel Corp.

**Robert R. Schneider** was made field sales manager, **Flexonics Corp.,** Maywood, Ill., subsidiary of Calumet & Hecla Inc.

**Jones & Laughlin Steel Corp.** named **Robert F. Good** assistant district sales manager, Detroit; **John B. Powel** assistant district sales manager, Philadelphia.

**Robert L. Deneau,** sales engineer, was appointed assistant to the general sales manager of **Buhr Machine Tool Co.,** Ann Arbor, Mich.

**Dr. Herman Blumenthal** joined **Chromalloy Corp.,** White Plains, N. Y., as research director, Chromalloy Div.

**Jack D. Tolliver** was named to the new post of field sales manager, **Tube Turns Div.,** Chemetron Corp., Louisville.

**Arthur W. Keough** was made quality control manager, Los Angeles Div., **Avnet Electronics Corp.**

**M. A. Young & Co.** appointed **Ricky Odle** as a trader located in its Youngstown office.

**Edward J. Strong** was made Southwest regional manager, Industrial

ROLAND J. FERNEKES LELAND C. SHARRON

*Landers, Frary & Clark appointments*

GEORGE D. BECKER DONALD M. STRATHEARN

*Controls Co. of America management posts*

# Sample pages from A-L's new free booklet on design

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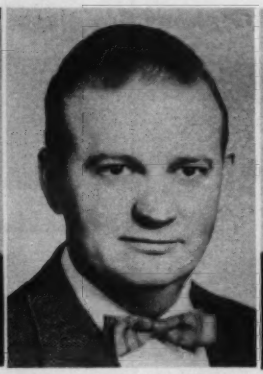
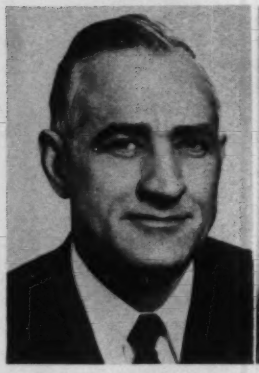
**GREGORY C. GATES**
*P&W purchasing mgr.*



**S. E. DANYOW**
*Rocket Power-Talco v. p.*

**WALTER A. ST. CLAIR**
*Hyster div. sales mgr.*



**DONALD W. KNUDTSON**
*Lewis Bolt & Nut v. p.*

**ROBERT T. ARNOLD**
*Anaheim Electronics mgr.*

**M. M. YORK**
*AC div. marketing*

Controls Section, **Bendix Aviation Corp.**, Dallas.

**Donald W. Knudtson** was made vice president, **Lewis Bolt & Nut Co.**, Minneapolis. He will handle all works management of the Minneapolis plant.

**Robert T. Arnold** was made manager of the newly organized **Anaheim Electronics Div. of Electronic Engineering Co.** of California, Santa Ana, Calif. He was president and treasurer of Anaheim Electronics Co. Inc., recently purchased by Electronic Engineering.

**Dr. Lawrence R. Scharfstein,** former corrosion engineer with Westinghouse Electric Corp., was appointed supervisor-corrosion research, **Carpenter Steel Co.**, Reading, Pa.

**J. W. Loveland** was made assistant general sales manager, Electrical Conductor Div., **Kaiser Aluminum & Chemical Sales Inc.**, New York. **W. W. Hicks** succeeds Mr. Loveland as electrical conductor sales manager of the Northeastern region.

**M. M. York** was made marketing manager, Industrial Equipment Div., **Allis-Chalmers Mfg. Co.**, Milwaukee. He was North Central regional manager, Chicago.

**George D. Becker** was named general manager, Heating & Air Conditioning Div., Milwaukee, **Controls Co. of America.** He is vice president-operations for the company, and remains at headquarters in Schiller Park, Ill. **Donald M. Strathearn,** company vice president, was promoted to general manager, Appliance & Automotive Div., Schiller Park. He is succeeded as director of sales, Appliance & Automotive Div., by **John A. Kovas.**

**Theodore K. Friedt** was elected vice president-assistant general manager of **United Platers Inc.**, Hamtramck, Mich.

**Dr. Robert H. Pry** was named manager, Alloy Studies Section, at **General Electric Research Laboratory,** Schenectady, N. Y., General Electric Co.

**Gregory C. Gates** was appointed purchasing manager, **Pratt & Whitney Co. Inc.,** West Hartford, Conn. He was procurement supervisor at Hamilton Standard Div., Windsor Locks, Conn., United Aircraft Corp.

**S. E. Danyow** was made vice president, rocket and ballistic operations, at **Rocket Power-Talco Div.,** Gabriel Co., Mesa, Ariz. He was general manager, Talco Engineering Co., at Falcon Field in Mesa.

**Walter A. St. Clair,** assistant sales manager, was promoted to sales manager, Industrial Truck Div., **Hyster Co.**, Portland, Oreg. The post was vacated last year when **Robert F. Moody** was promoted to general sales manager.

**James G. Baldwin** joins **Hooker Chemical Corp.** Apr. 1 as general manager, Western Chemical Div., Tacoma, Wash. **Russell O. Vognild** will succeed **Horace W. Hooker** as division sales manager. Mr. Hooker, early this summer, will move East to new company headquarters in New York to assume new corporate duties. **George A. Gentes,** former production manager, Western Chemical Div., becomes chief engineer for the corporation to succeed **Donald E. Springer,** made director of corporate engineering. Mr. Gentes will also move East early in the summer and will be at corporate engineering headquarters in Niagara Falls, N. Y. Until they move from Tacoma, Mr. Hooker and Mr. Gentes will serve in advisory capacities. **John W. Judy** was made works manager of the Tacoma plant.

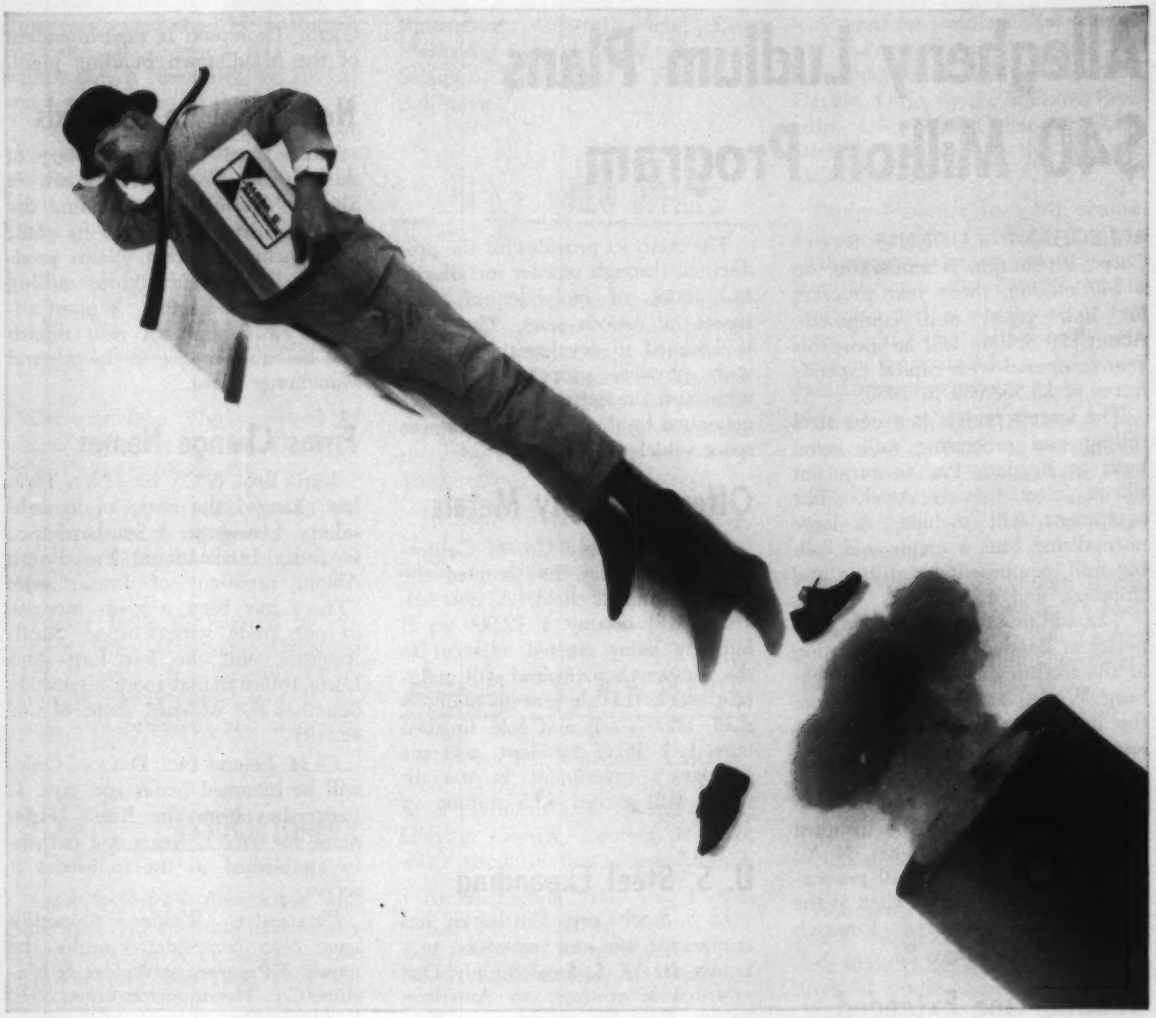
**Joseph Glasser** was named manager of manufacturing for **Raytheon Co.'s** Commercial Apparatus & Systems Div., Waltham, Mass.

**J. E. Dill** was made manager of **Abbey Etna Machine Co.'s** new Cleveland district branch office.

## *OBITUARIES...*

**Fred G. Wilson,** 64, vice president, **Waterbury Co. Inc.,** Waterbury, Conn., died Mar. 15.

**Noel H. Miller,** 55, western sales manager, Automotive Div., **Modine Mfg. Co.**, Racine, Wis., died Mar. 15.



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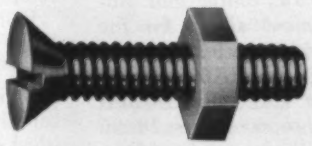

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# Allegheny Ludlum Plans $40 Million Program

ALLEGHENY LUDLUM Steel Corp., Pittsburgh, is embarking on a $40 million, three year program for new plant and equipment. About $20 million will be spent this year compared with capital expenditures of $5,508,000 in 1959.

The largest project is a new steel rolling and processing mill being built at Bagdad, Pa., to turn out silicon electric strip steel. The equipment will include: A large normalizing line, a major cold rolling mill, equipment for slitting and shipping, and auxiliaries.

The additional manufacturing capacity at Bagdad will free a portion of the facilities at the West Leechburg Works, across the river from the new site, for processing stainless steel strip.

Other major expenditures: A vacuum melting furnace of the consumable electrode type, to be installed late this year at Watervliet, N. Y.; pilot plant versions of mill processing equipment being installed at the firm's new centralized Research Center, Brackenridge, Pa.

## Coating Line Extended

Kaiser Aluminum & Chemical Corp., Oakland, Calif., has placed in operation facilities for producing painted aluminum coils at its Ravenswood, W. Va., rolling mill. Automatic equipment allows for the coating of widths up to 66 in. in gages ranging from 0.006 in. to 0.064 in. The entire Ravenswood paint installation comprises 18 in. roll coating equipment, the 66 in. line, and auxiliary machinery for slitting, shearing, and embossing the coiled aluminum.

## Sylvania Gets Navy Award

Chemical & Metallurgical Div., Sylvania Electric Products Inc., Towanda, Pa., received a $356,000 Navy contract for development work in producing and rolling molybdenum alloy sheets. Sylvania is a subsidiary of General Telephone & Electronics Corp., New York.

The contract provides for the production, through powder metallurgy techniques, of molybdenum alloy sheets in various sizes. The work is designed to develop the product with physical properties able to withstand the extreme temperatures generated by the fuels used to power space vehicles.

## Offers Specialty Metals

Republic Supply Co. of California, Los Angeles, has entered the specialty metals field. A new division will occupy a 72,000 sq ft building being erected adjacent to the company's plant and will maintain stocks of aluminum, stainless steel, alloy steel, and cold finished bars. J. J. Pike, president, says the company's investment in the division will exceed $2.5 million in 1960.

## U. S. Steel Expanding

U. S. Steel Corp., Pittsburgh, has announced two new expansion programs. Its U. S. Steel Supply Div. awarded a contract to American Bridge Div. for construction of a steel service center at 21st Street & Avenue C, Ensley, Ala. The structure will feature overhead cranes, shearing, sawing, and flame cutting equipment.

Universal Atlas Cement Div. plans to double the capacity of its plant at Waco, Tex. A second rotary kiln will be installed, lifting capacity to 2 million bbl of finished cement.

## Armco to Enlarge Plant

Armco Drainage & Metal Products Inc., subsidiary of Armco Steel Corp., will erect a $440,000 addition to its steel building manufacturing plant at Middletown, Ohio. New forming and punching machinery will be installed for the manufacture of newly engineered steel purlins to be used in the firm's 1960 line of steel buildings. The purlins will be produced and painted on a continuous production line. Glenn Thompson is superintendent of the Middletown building plant.

## Nelco Tool Co. Expands

Nelco Tool Co., a subsidiary of the Cutting Tool Div., Brown & Sharpe Mfg. Co., is expanding the manufacturing facilities of its plant in Manchester, Conn. Nelco products include carbide tipped milling cutters and end mills. A plant addition to be finished next month will be equal in size to the original Manchester plant.

## Firms Change Names

Luria Bros. & Co. Inc., New York, has changed the name of its subsidiary, Livingston & Southard Inc., to Luria International Inc. Ralph Ablon, president of Luria, says: "There has been a great increase in our trade with Europe, South America, and the Far East—and Luria International more accurately describes the widened scope of our activity."

G. H. Leland Inc., Dayton, Ohio, will be renamed Ledex Inc. Apr. 1. Ledex has been the firm's tradename for over 12 years and is firmly established in the industries it serves.

Progressive Welder properties have been consolidated under the name of Progressive Welder & Machine Co. Headquarters are at 3070 E. Outer Dr., Detroit, Mich. Divisions of the company include Special Machine, Special Automotive Engineering, and Frostrode, Pontiac, Mich.; Portable Equipment and Warren Alloy Foundry, Warren, Mich.; and Transformer & Parts, Vicksburg, Mich.

## Techalloy Buys Strip Mill

Techalloy Co. Inc., Rahns, Pa., has ordered $1 million worth of strip mill equipment. Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has the contract for a 17 in. Sendzimir mill for rolling stainless steels, Monel, nickel, Inconel and other heat resisting alloys. General Electric Co., Schenectady, N. Y., will supply the electrical controls and motor-generator sets designed with wide range of tension control for rolling extremely thin foil.

Contract for two 17 in. slitting

lines was awarded to H. J. Ruesch Machine Co., Newark, N. J. The equipment is designed to slit as small as 0.001 in. by 3/32 in.

Terminal takeup equipment for twin bright hydrogen strand annealing furnaces will be supplied by Herr Equipment Corp., Warren, Ohio.

## NEW ADDRESSES

**Crescent Iron Works** moved its offices and plant to 7009-21 Grays Ave., Philadelphia 42, Pa.

**Maytag Co.**, Newton, Iowa, centralized its St. Louis branch operations at 9291 Watson Industrial Park.

**Parker Brass Co.** moved its operation from Delaware, Ohio, to 1111 Cherry St., Toledo, Ohio. James R. Parker is president; B. W. Lang, vice president and treasurer.

## ASSOCIATIONS

**Lead Industries Association** and **American Zinc Institute** have jointly leased 8000 sq ft of space at 292 Madison Ave., New York. They will take occupancy May 1.

**National Metal Trades Association**, Chicago, elected these vice presidents: J. A. Bradner, Lees-Bradner Co., Cleveland; and J. J. Hall, Brown & Sharpe Mfg. Co., Providence, R. I.

**Hoist Manufacturers Association Inc.**, Washington, elected these officers: President, H. W. Gledhill Jr., Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.; vice president, F. E. Rau, Yale & Towne Mfg. Co., Philadelphia; and executive secretary and treasurer, J. H. Peritz.

Leo E. Selig, J. Solotken & Co. Inc., Indianapolis, was elected president of the **National Association of Waste Material Dealers Inc.**, New York. Vice presidents are: W. H. Daley, Independent Paper Stock Co., San Francisco; Theodore Gruen, International Minerals & Metals Corp., New York; Charles Rubenstein, Central Metal Co., Plainville, Conn.; and Bernard Schapiro, S. Schapiro & Sons Inc., Baltimore.

## NEW OFFICES

**Sel-Rex Corp.**, Nutley, N. J., producer of precious metal plating processes, established a branch office at 1000 Peachtree St., Atlanta, Ga. The office will also handle equipment and supplies manufactured by the company's subsidiary, Meaker Co., Chicago.

**Richardson Scale Co.**, Clifton, N. J., opened a district office at 2425 W. Holcombe, Houston 25, Tex. Jerry Brice is manager.

## NEW PLANTS

**Canco Div., American Can Co.**, New York, dedicated its 150,000 sq ft plant on Lake Mirror Road, Clayton County, Georgia. It is 14 miles south of downtown Atlanta.

**Air Reduction Sales Co.**, a division of Air Reduction Co. Inc., New York, dedicated its multimillion dollar plant at Fairfield, Ala. Daily capacity of the plant is more than 30 tons of liquid oxygen, nitrogen, and argon. A similar plant at that site will be completed this fall.

**Industrial Truck Div., Clark Equipment Co.**, Buchanan, Mich., established factory sales and service branches at 300 E. Milwaukee Ave., Detroit, Mich., and 2630 S. Grand Traverse Rd., Flint, Mich. J. A. Boley is general manager of branch operations.

**Carter Products Inc.** erected a manufacturing and office building in Cranbury, N. J. The 250,000 sq ft facility will turn out bandsaw accessories. A research laboratory is being constructed next to the plant.

**Boston Woven Hose & Rubber Co.**, a division of American Biltrite Rubber Co. Inc., Boston, will construct a plant in Hohenwald, Tenn. The plant will cost about $3 million. Its size: About 200,000 sq ft.

A plant for stainless alloy brazing and furnace heat processing has been opened at 5221 Webster St., Dayton, Ohio, by the **Stainless Processing Div., Wall Colmonoy Corp.**, Detroit. Manager of the plant is Dale Finfrock.

**Cutler-Hammer Inc.**, Milwaukee, will construct a 35,000 sq ft plant at Belmont, Calif., to replace manufacturing and office quarters in San Francisco and a warehouse at San Jose, Calif. The facility will produce motor control lines and power distribution equipment.

**Birmingham Steel Buildings Inc.** is erecting a 10,000 sq ft addition to its plant at Birmingham. The $100,000 facility will be used for the manufacture of overhead cranes and monorails.

**Besly-Welles Corp.**, South Beloit, Ill., opened a warehouse and branch office at 1025 Greeley Ave., Union, N. J. Cutting tools and gages are stocked.

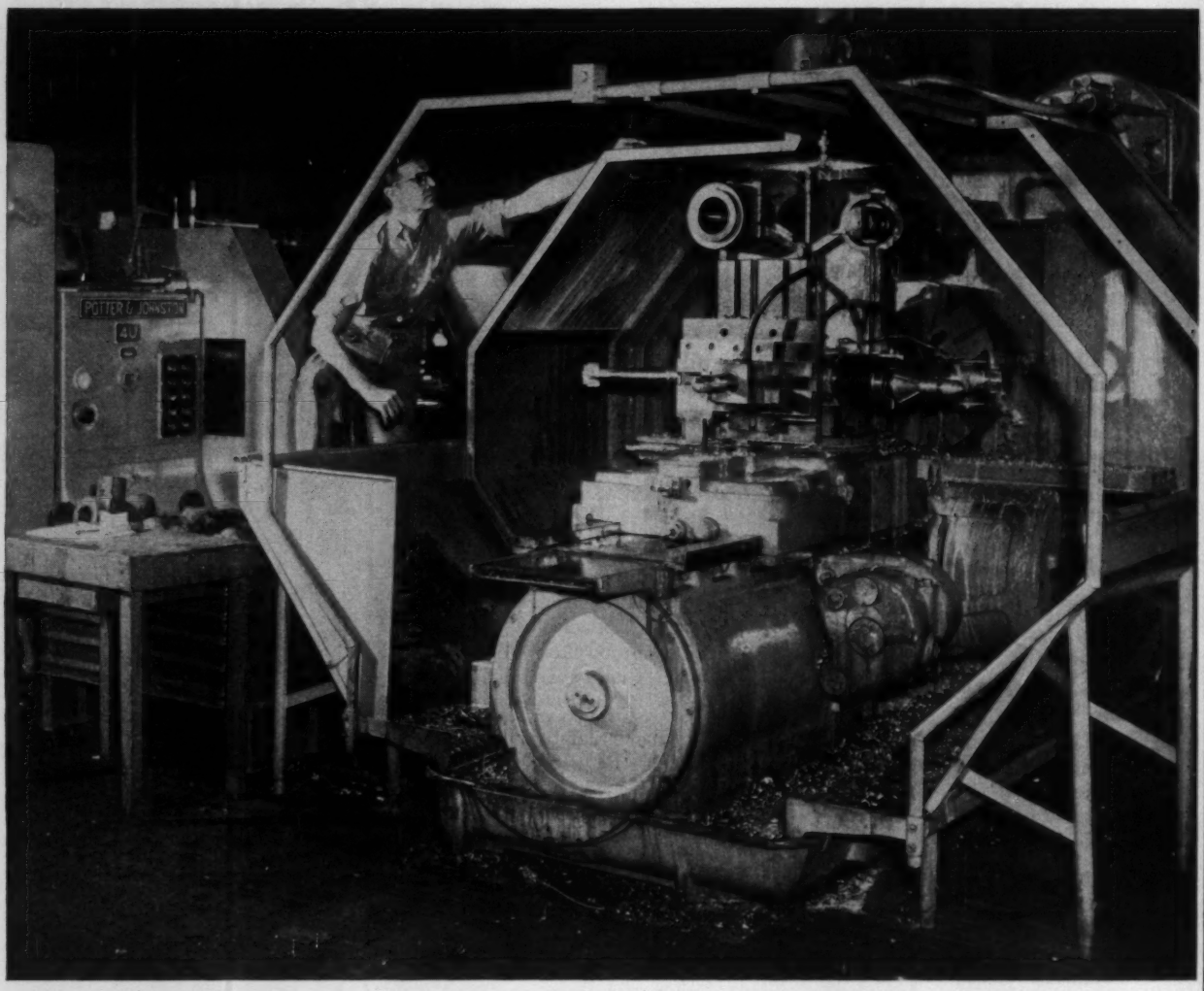
## CONSOLIDATIONS

**Marmon-Herrington Co.**, Indianapolis, acquired the assets of **Long Co.**, Oak Hill, W. Va., manufacturer of underground mining machinery. The property will be operated as part of the new owner's division, Long-Airdox Co., Chicago. John B. Long is president and chief executive of the division and vice president of Marmon-Herrington.

**Leeds & Northrup Co.**, Philadelphia, purchased **Thomas S. Gassner Co. Inc.** and its affiliate, **H. D. Dougherty & Co.**, that city. The Gassner firm makes sheet metal products, and its affiliate has been a selling company for one of its specialty lines. Charles J. McKee remains as president of both companies. I. M. Stein is president of Leeds & Northrup.

**Miehle-Goss-Dexter Inc.**, Chicago, acquired **Fidelity Instrument Corp.**, York, Pa., manufacturer of such products as voltage regulators, variable speed drives, and power packages. The firm is also active in electronics. A. A. Wolf continues as president of Fidelity.

# "Valve Bodies machined




## JOB FACTS

**THE PART:** Plug Valve Body

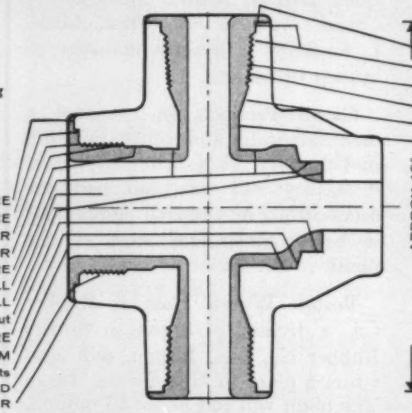
**MATERIAL:** 4140 Steel Casting, 287-301 Bhn

**REQUIRED:** A total of 33 roughing and finishing cuts, involving very heavy metal removal.

**THE MACHINES:** A Potter & Johnston 6DREL-40 and a Potter & Johnston 4-U.

## FIRST OPERATION

FACE
FACE
CHAMFER
FORM CONTOUR
COUNTERBORE
STEPPED CORE DRILL
PILOT BORE FOR DRILL
FACE, Single Point Cut
BORE
FACE BOTTOM
FORM CONTOURS, Single Point Cuts
STRAIGHT THREAD
CHAMFER




## SECOND OPERATION

FACE, Single Point Cuts
STEPPED CORE DRILL
FORM TAPER, Single Point Cut
TAPER THREAD
FORM CONTOUR, Single Point Cut
CORE DRILL

## THIRD OPERATION

(Index and repeat operation on opposite end.)

## THE RESULTS

**A part completed every 6½ minutes-** a time saving of 80% over previous methods. The first operation is performed on one machine. While this is working, the other machine is loaded, and the second and third operations are completed.

**SHADED AREAS INDICATE METAL REMOVED**

# in One-Fifth the time

## ...plus attractive savings in set-up time!"

**Two Potter & Johnston Automatic Turret Lathes . . .** a Model 4-U and a Model 6DREL-40 recently installed in the Mission Manufacturing Company's plant at Houston, Texas . . . are now producing plug valve bodies in 20% to 50% of the time previously required using hand turret lathes. Widely used in oil field and chemical industry applications, these valve bodies are machined from heavy steel castings. The multiple machining operations require very heavy metal removal, demand close tolerances and, in addition, involve the generating of complex internal contours. Looking for a means of speeding up these machining operations, Mission investigated Potter & Johnston and other makes of machines. P&J Automatics were finally selected, because they are sturdier and heavier and because of the extreme savings in the set-up time for the various jobs. Other factors influencing Mission's choice include the accuracy of the P&J Machines, the savings in floor space made possible by their high output-per-area, and the fact that their completely automatic operation insures greatly increased production per man-machine hour.

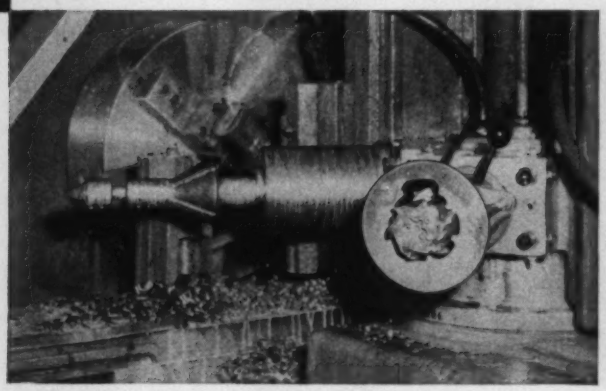
Combining extra power and rigidity for fast metal removal with the versatility needed to handle complex multiple cuts with speed and efficiency, Potter & Johnston Automatics can increase productivity and cut costs at your plant the same way they have at the Mission Manufacturing Company. For the dollars-and-cents facts, ask for production estimates on your jobs. Call the Pratt & Whitney Branch Office in your area or write direct, outlining your production needs.

*PRATT & WHITNEY COMPANY, INC.,*
*13 Charter Oak Boulevard, West Hartford, Conn.*

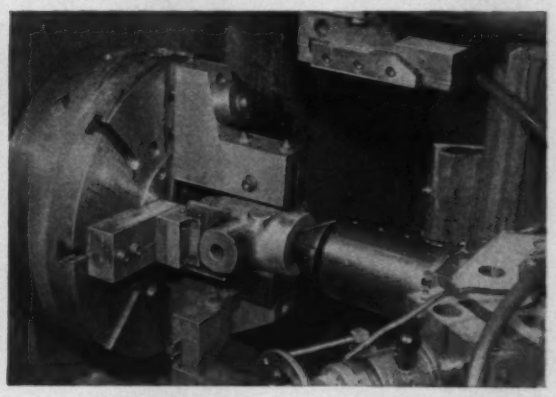
**POTTER & JOHNSTON AUTOMATICS**
*MANUFACTURED BY*

100th Anniversary 1860 1960

**PRATT & WHITNEY®**
*FIRST CHOICE FOR ACCURACY*
MACHINE TOOLS • GAGES • CUTTING TOOLS



**Heavy metal removed fast . . .** contributes to the important time savings realized on this job. Heavy cuts like this require unusually powerful, rigid machines, like the P&J 6DREL-40 and 4-U.



**Important savings in set-up time . . .** are realized because this tooling, designed by P&J Specialists working with the manufacturer, incorporates an unusual degree of versatility and adaptability.

BIRMINGHAM—FAirfax 2-2581

BOSTON—HUbbard 2-9830

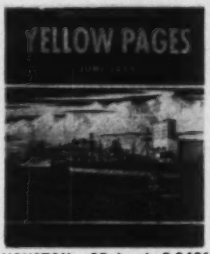
CHICAGO—VAnderbilt 4-4122

DAYTON—KEnmore 6-104

# YOU'LL FIND THE ANSWER TO

DENVER—AComa 2-5704

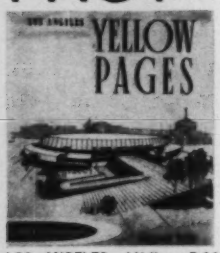
DETROIT—FOrest 6-9626




HOUSTON—ORchard 2-9401

KANSAS CITY—DRexel 1-0034

# FAST FERRO-ALLOYS SERVICE




LOS ANGELES—LUdlow 5-1128

MILWAUKEE—Broadway 6-6930

Ohio Ferro-Alloys Corporation
Canton, Ohio

# FROM LOCAL WAREHOUSE STOCKS

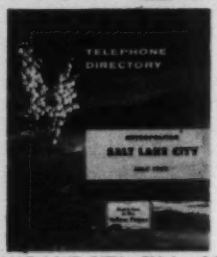
MINNEAPOLIS—FEderal 9-0231

OAKLAND—OLympic 8-3300

ROCK ISLAND—6-3364

ST. LOUIS—GArfield 1-3110

# IN EACH OF THESE BOOKS!




SALT LAKE CITY—EMpire 3-8932

TACOMA—MArket 7-0321

VANCOUVER, B. C.—MUtual 4-8531

Whenever you need ferro-alloys and wherever you are, the fast, dependable way to get what you need is to call the Ohio Ferro-Alloys warehouse or distributor nearest you. You'll find these experienced, helpful people in the cities represented by the phone books shown here, and a phone call will bring you the kind of service that makes molehills of mountains.

**SALES OFFICES** BIRMINGHAM, BOSTON, CHICAGO, DENVER, DETROIT, HOUSTON, KANSAS CITY, LOS ANGELES, MINNEAPOLIS, PHILADELPHIA, PITTSBURGH, ST. LOUIS, SALT LAKE CITY, SAN FRANCISCO, SEATTLE, VANCOUVER, B. C.

**QUENCHABLE CAST IRON WELD**—An electrode just introduced is said to weld cast iron in one-fourth to one-tenth the time formerly required, leaving a deposit that does not need to be slow cooled before a second is applied. Eutectic Welding Alloys Corp. of America, Philadelphia, says applications include: Repair of machine bases, pump housings, gears, presses, and similar heavy cast machinery.

**THERMOELECTRICITY BOOMING** — If you plan to enter this new field, you can now buy thermoelectrical cooling devices in commercial quantities (STEEL, Feb. 29, p. 57). The Semiconductor Dept., Westinghouse Electric Corp., Pittsburgh, suggests its version will spot-cool electronic components to protect them from premature failures.

**BRAZING AIDS ELECTRONICS** — Success of the Nuvistor, an improved kind of radio tube, is due partly to a simple, reliable method of metallizing a ceramic, and an improved continuous brazing furnace, claims Radio Corp. of America, New York. Eleven wires are vacuumproof sealed through a ceramic wafer.

**SPATTER LOSS CUT**— A new E6012 - type welding rod cuts spatter loss 60 per cent, boosts deposition efficiency 15 per cent at high currents, claims A. O. Smith Corp., Milwaukee. It adds that the rod leaves a high crown which increases crack resistance.

**SAVES HANDLING**—Packing stampings in cardboard cartons (pallet size) permits quick, automatic identification, says a source at Fisher Body Div., General Motors Corp., Detroit. The method permits automation of railroad carloading.

**ATOMIC COST BRIDLE**—Preliminary studies hold out some hope that carbon and low-alloy steels will be practical for nuclear powerplants in place of the high alloy and stainless types now used, says General Electric Co., Schenectady, N. Y. Reason: Oxygen-hydrogen present in boiling water in a reactor forms a protective film which inhibits corrosion. Findings are based on tests being conducted for U. S. Steel Corp.

**ANODIC COLORBURST**— A new anodizing process, tested more than four years, gets its colors from the reactions between chemicals and elements in the metal, states Kaiser Aluminum & Chemical Sales Inc., New York. The firm claims coatings are unusually stable and uniform.

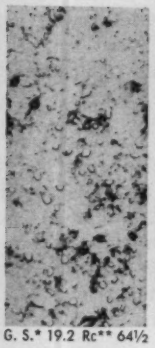
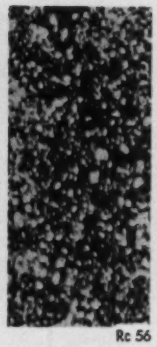
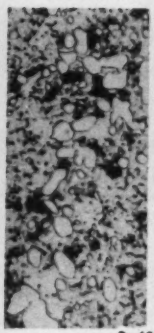
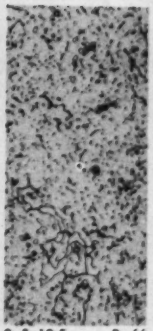
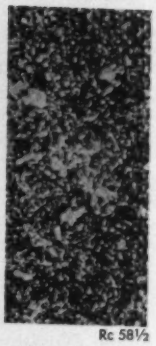
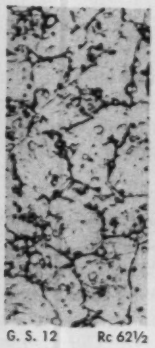
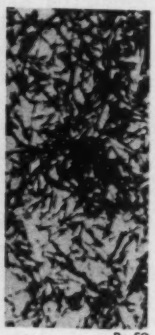
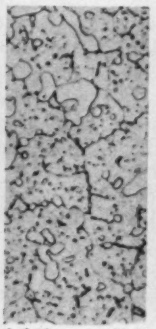
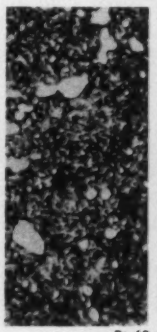
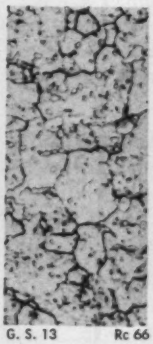
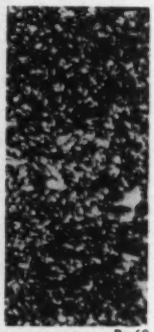
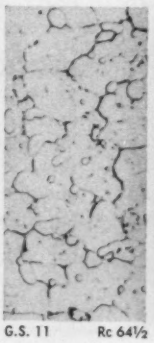
**BRAZING TIPS**—Small camshafts can be built up from individual cams by copper brazing, says National Cash Register Co., Dayton, Ohio. Another idea: A paste of lard oil and copper powder is an ideal substitute for brazing preforms in hard to reach places, especially in tiny parts. The business machine maker has its own formulation.

**EXTRUDES METAL OVERCOAT**— A new process puts cladding on metals by extruding both in a specially constructed press. Battelle Memorial Institute, Columbus, Ohio, reports it has handled a wide variety of shapes in aluminum-clad steel, copper, nickel, and some alloys. Other advantages: Close dimensional control; strong bond between core and cladding.

**REVERSE RECTIFIER BOOMS**— The Trinistor (it has no moving parts, see STEEL, Jan. 25, p. 65) is changing direct current into alternating at a cost which prompts experts to predict it will compete successfully with motor-generator systems by 1965. Westinghouse Electric Corp., Pittsburgh, claims the device has far greater potential for heavy power applications than the transistor.

**DUCTILE NICKEL PLATE**— A new, semibright nickel plating process called Permalume is both ductile and high leveling, claims Hanson-Van Winkle-Munning Co., Matawan, N. J. It lists these advantages: Air agitation permits high speed operation; bath may be continuously carbon treated; chemistry is easy to control.

# New Air Hardening Steel Can Improve Wear Resistance

| Temperature °F | A-2 Steel | | D-2 Steel | | Airque V | |
|---|---|---|---|---|---|---|
| | Air Hardened | Hardened and Tempered | Air Hardened | Hardened and Tempered | Air Hardened | Hardened and Tempered |
| 1750° |  G. S.* 19.2 Rc** 64½ |  Rc 56 |  Rc 60 | Rc 57 |  G. S. 19.5 Rc 66 |  Rc 58½ |
| 1850° |  G. S. 12 Rc 62½ |  Rc 59 |  G. S.12 Rc 64 |  Rc 60 |  G. S. 13 Rc 66 |  Rc 60 |
| 1950° | G. S. 6½ Rc 54½ | Rc 53 |  G.S. 11 Rc 64½ | Rc 62 | G. S. 11½ Rc 62 | Rc 59 |

*Grain size.

**Rockwell hardness.

**Service life for applications combining shock and wear has been increased by higher contents of carbon and vanadium. Ability to harden in air holds down distortion**

USERS of steels requiring a combination of wear resistance and toughness have a new material with which to work. Called Airque V by the supplier, Braeburn Alloy Steel Corp., Braeburn, Pa., it has been developed to increase the wear resistance of the A-2 (5 per cent chromium) air hardening steels.

Already in use for gages, slitters and knives, dies (thread rolling, powder metal, stamping, forming and trim), and similar purposes, it has also seen service for diesel engine injection plungers. Other suggested uses include press forging die inserts, grinding machine spindles, machine ways, and swaging dies.

• **Air Hardening**—Optimum hardening temperature is 1800° F, slightly higher than the AISI Grade A-2 which was its progenitor. And the alloy hardens in air, even in fairly large sections. Still air will suffice in sections up to about 5 in. thick; an air blast may be used on heavier sections (a 5 in. cube will harden in still air to about 60 Rockwell C).

Usual heating methods—atmosphere, salt bath, or pack—can be used; a 1200° F preheat is recommended. Tempering (double tempering is best) will require 300 to 1200° F depending on hardness and shock resistance required.

Distortion on hardening of the new alloy is about the same as the A-2 grades, Braeburn reports. And expansion is substantially the same across and with the grain.

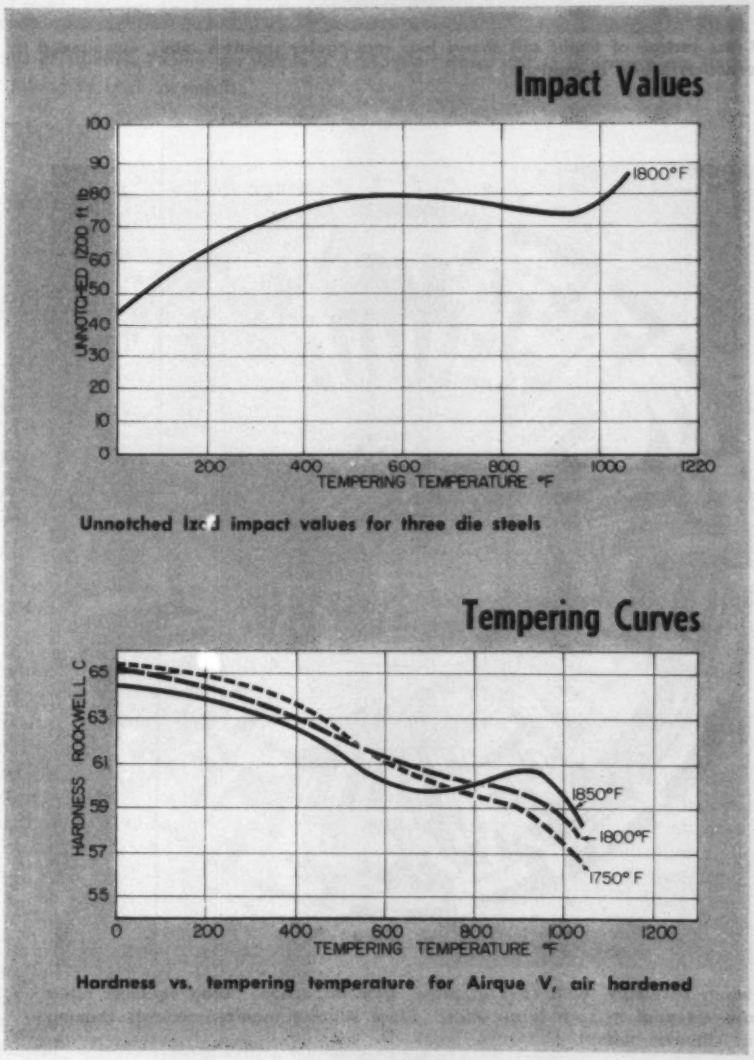
Airque V has this typical analysis:

| | Percentage |
|---|---|
| Carbon | 1.25 |
| Manganese | 0.50 |
| Silicon | 0.30 |
| Chromium | 5.25 |
| Molybdenum | 1.15 |
| Vanadium | 1.00 |

Principal difference between the new alloy and Braeburn's A-2 analysis (called Airque): Increased concentration of carbon and vanadium. Result of the changes: Increased hardness at all tempering temperatures (difference ranges from 1 to 3 points on the Rockwell C scale) and an increase of 20° F in the optimum hardening temperature. And it has less tendency to retain austenite on moderate overheating.

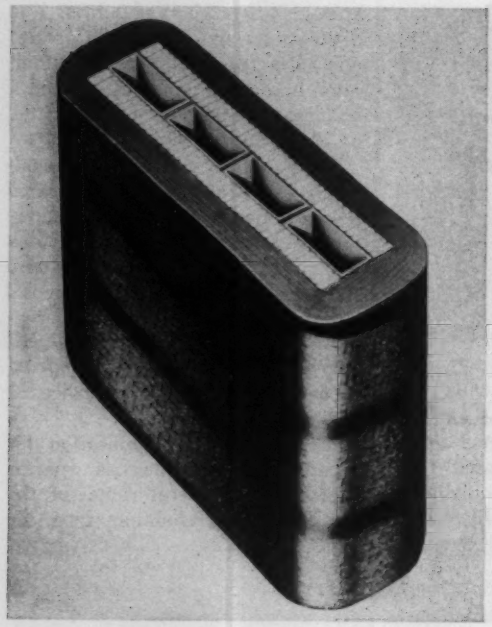
R. F. Harvey, research metallurgist at Braeburn, has prepared a series of photomicrographs, showing the structures of the new alloy with different treatments; D-2 and A-2 steels are included for comparison. (All magnifications, originally at 1000X, have been reduced to 750X for publication; tempered samples were treated twice at 950° F.)

The new alloy (application for a patent has been filed) is expected to extend the useful range of the the 5 per cent, chomium type, die steels.



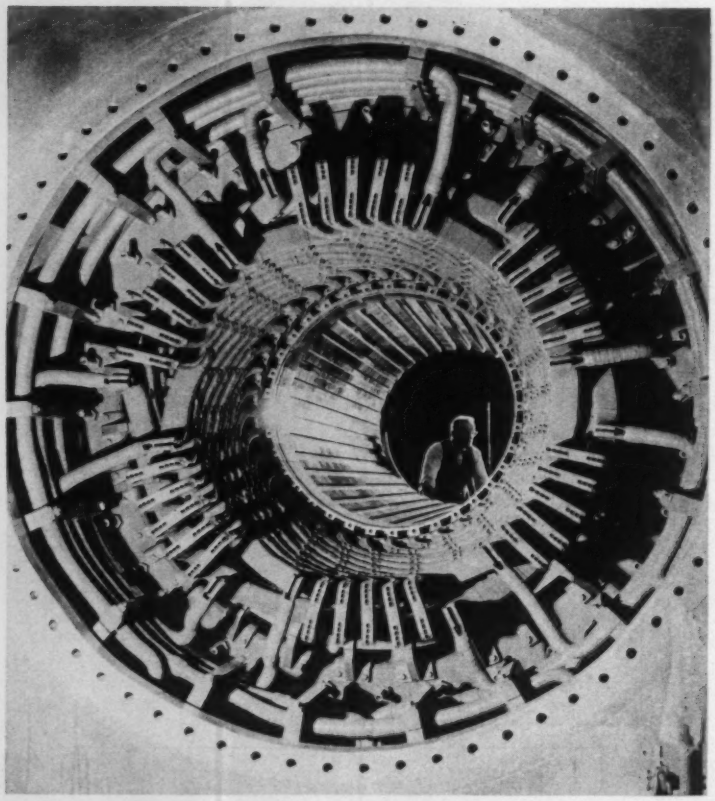

Unnotched Izod impact values for three die steels

Hardness vs. tempering temperature for Airque V, air hardened



# Thin Walled Stainless Tubes Carry Gas to Cool Generators

Cross section of stator coil shows four rectangular stainless tubes, surrounded by copper conductors and insulation



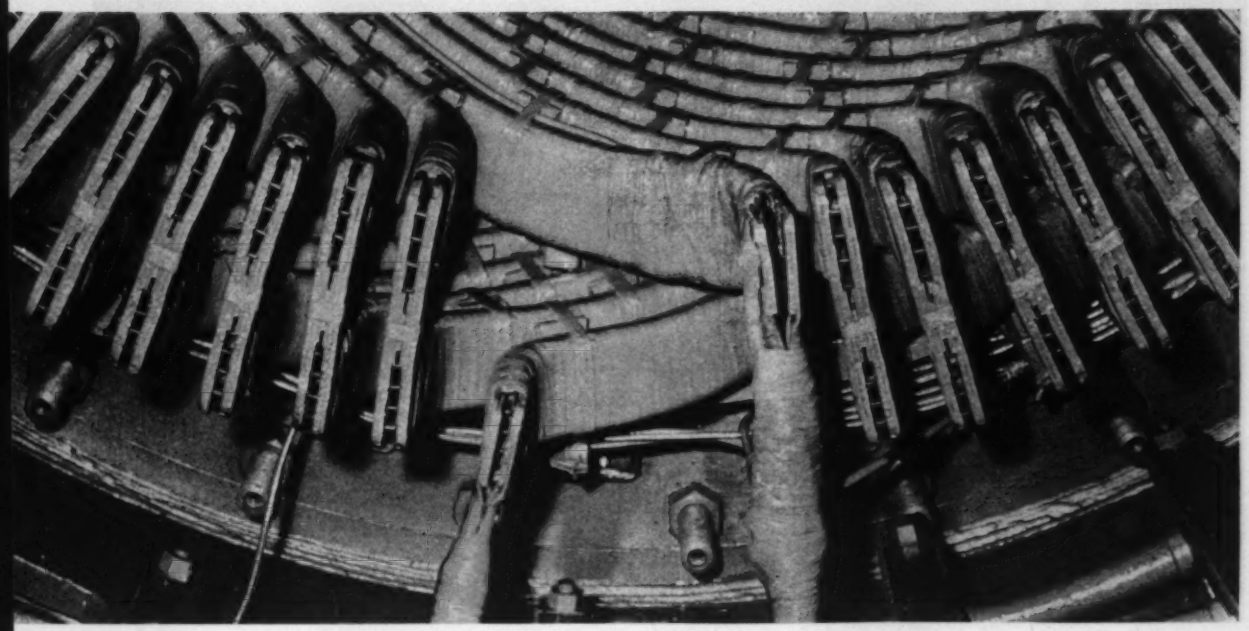
Stator assembly, with coils in place, gets inspection. Long stainless tubes are essential in such large units. Close spacing requires accurate forming of stainless tubing

**Rectangular Type 304 was chosen by Allis-Chalmers to meet tight specifications. Hydrogen is carried through fully supercharged steam turbine units to dissipate heat**

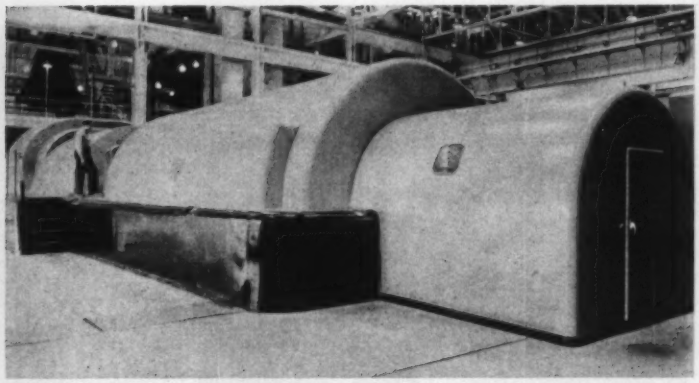
WELDED stainless steel tubing, carefully formed, helps steam turbine generators made by Allis-Chalmers Mfg. Co., Milwaukee, Wis., rev up a lot of power in a comparatively small space. The shaped tubes form part of the stator coils, carry hydrogen gas for cooling.

● **Advantages of Stainless** — The tubing is Type 304, rectangular in cross section, made by Carpenter Steel Co.'s Alloy Tube Div., Union, N. J. It was chosen for a number of reasons.

Because of the strong alternating magnetic field, a nonmagnetic material was required. The stainless has a high resistance, reducing the eddy current loses. Its strength permits thin walls; not only does that allow more room for copper and cooling gas but the tubing is easier to bend. And thinner walls improve heat transfer.



**Open ends of stainless tubing are visible in assembled stator coils. Hydrogen gas flows through tubing to cool assemblies**



**Large steam turbine generator in East Coast utility plant runs in hydrogen atmosphere. Gas cools, protects surfaces from oxidation**

The rectangular shape is required to conform with the coil construction in the stator, and gives added surface for cooling as compared with circular tubing of equal capacity.

• **More Power for Size**—The resistance of the coils to the passage of the generated current causes them to heat; the circulated hydrogen keeps the coils from overheating. So more power can be generated with a given size unit. And since the tube is an integral part of the coil, generated heat does not need to pass through layers of insulation before it can be dissipated; it is intercepted near the point of origin.

• **Forming Takes Care**—In a typical Allis-Chalmers 3600 rpm turbine generator, the stator is equipped with 288 rectangular stainless tubing sections, each 250 in. long. Tubing wall may be as thin as 0.025 in., so care and skill are required to form the shapes for assembly. Here's how Allis-Chalmers does it:

• Tubes are tested with compressed air.

• They are then filled with Cerrobend, a low melting alloy, which supports them during the bending process, prevents buckling.

• In a special form, they are bent to shape at room temperature.

• A thin layer of silicone rubber insulation is applied.

• Tubes and copper conductors are assembled.

• Insulation is baked. (The Cerrobend melts and runs out.)

• Coils are insulated with mica tape.

Specifications call for tubes to be clean and free from burrs or scale. Surface may be pickled or bright annealed. Since the entire unit operates in a hydrogen atmosphere, there is no attack on the tubes in service and no cleaning is required. No heat treatment is needed after bending.

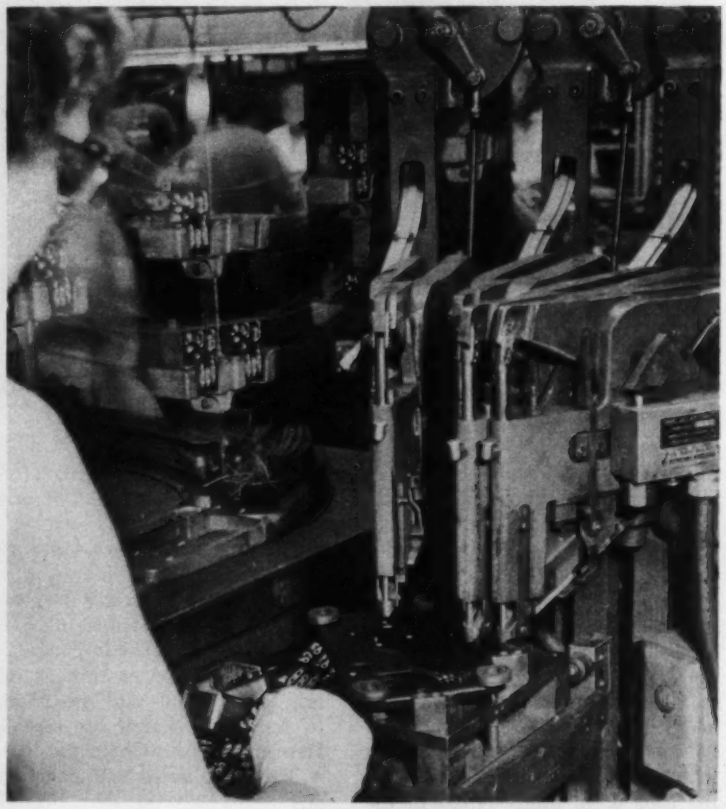
Hydrogen velocities through the stator may be as high as 10,000 fpm. Operating temperatures range from 104 to 266° F. While the pressure of hydrogen in the system may range from 1 to 4 atmospheres, it is essentially uniform throughout the system, and there is little pressure differential from the inside to the outside of the tubes.

*• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Each of the four stations on this line consists of four, grouped riveting machines and appropriate fixtures. In production: The base plate for a general purpose telephone

# Departure From Custom Speeds Up Riveting Line

Machines are grouped to rivet a combination of parts in the same cycle. Fixtures speed locating and trigger the machine starts. Adjustable pressure helps prevent part breakage



When the operator slides this fixture into position, it trips the cycle start button through a microswitch to activate close grouped riveting heads

ENGINEERS at Western Electric Co.'s Indianapolis plant tailored an entire rivet setting line for high speed assembly of telephone equipment. The departure from the practice of placing rivet setting machines at random in the production line is paying off.

These three steps were taken:

Machines were clustered so they could set a combination of rivets in a single cycle.

Special fixtures were worked out so the parts could be positioned under the spindles accurately, yet with little operator effort.

The small part handling system was laid out so the operators could reach and maintain a high rate of production.

**• In the first assembly operation, four composition pads are put at the corners of the base plate.**

Next comes the riveting of a network box, a dial bracket, a switch bracket, a ringer bracket, and a cord hook to its face. Those operations are done at a series of stations, each consisting of four automatic setting machines arranged in clusters.

The first operator sets the four rivets for the pads. The second operator sets three rivets in the switch bracket and one in the ringer bracket. The third operator sets two of the three rivets for the dial switch and two for the cord hook bracket. The last operator completes the sequence, setting two rivets in the network box and one each in the cord hook and ringer brackets.

At each of the four stations, a sliding fixture positions the parts. The operator sets the base plates on the fixture, adds the parts to be riveted, and moves the fixture under the machine jaws. When the fixture is properly located, it strikes a microswitch that cycles the machines.

**• The absence of a flywheel and the compactness of the setting mechanism enables Western Electric engineers to get closer center-to-center rivet spacing than would otherwise be possible.**

They also get further improvements in spacing by mounting hoppers on the rear of the machines.

The machines set rivets with center distances as close as ½ in. and as far apart as 2¾ in. Production personnel take advantage of the adjustability of pneumatic actuation in a number of applications. One is the assembly of two spring clips that retain the plastic window around the pushbuttons on a key set telephone. Slight variations in material thickness can cause the plastic to crack. By controlling the speed and impact of the setting operation, and the setting pressure, cracking is precluded.

Single spindle machines are used for this job. The operator starts the cycle by placing eight spring clips and four plastic windows in the fixture. She then folds over two leaves of the fixture, guides the fixture under the spindle, and rivets a row of holes. Reversing the fixture, she rivets the other row.

**• On another line, for producing a wall telephone, ten riveting machines are connected with conveyor lines to keep flow of parts constant.**

To avoid mixups in loading and setting machines, all rivets are alike: Semitubular, 0.12 in. in diameter, zinc plated, with oval shaped heads.

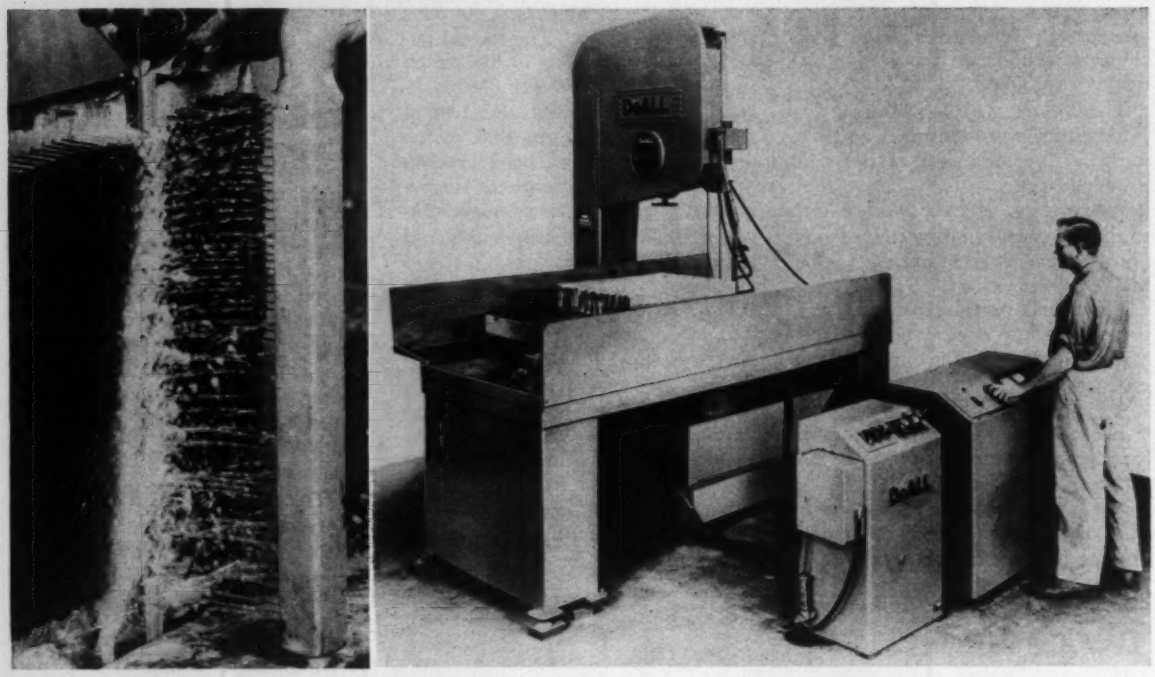
The ten machines are clustered around two work stations, six around the first and four around the second. A bridgelike workbench connects the two.

In another case, riveting speed is subordinate to precision. A fine wire coil spring has to be attached to one end of a metallic brace. To function properly, the spring must be anchored at one end and then pivoted about 135 degrees around another point about 11/16 in. away. Two, adjustable-center setting machines are used for the job. The anvil on one is adjusted to give a tight set rivet; the other is set to allow the rivet to pivot. Both spindles come down together.

With those techniques, Western Electric's production men will turn out more than 7 million telephone sets a year—setting more than 160 million tubular and semitubular rivets in completing the assemblies.

**Four plastic windows for a pushbutton telephone are positioned with eight spring clips in this fixture. Fixture then passes under single spindle**

# Spark Machining Joins Band Cutting Team



**A slab of stainless steel honeycomb (left) is cut with electric arc formed on leading edge of blade. Model 3624-X1 (right) shows modified bandsaw for electric band machining**

A NEW LINE of bandsaw units employs the spark machining concept to slice through fragile honeycomb structures of aluminum, stainless steel, zirconium, and titanium. Result: Low material waste, burrfree surface, and reduced distortion.

The developer, DoAll Co., Des Plaines, Ill., uses modified standard sawing machines for a technique it calls quenched arc cutting.

• **Blade with No Teeth**—An electric arc cuts the material by erosion as the part is fed to a rapidly moving blade. A low voltage, high current power supply sustains the arc at the leading edge. Since the saw is not subject to a cutting force, the bands developed by DoAll are of various types, including wire.

A flood of coolant limits the arc and localizes the heat generated to the portion being cut. That prevents metallurgical changes, and carries away the cutting swarf, leaving a clean, burrfree surface.

The advantage of a burrfree cut is that no grinding is required. The finish, claims DoAll, is equivalent to that produced by grinding. Large sections can be fabricated and pieces sliced off (with cuts only 1/32 wide) to finish size. Both time and material are saved.

• **Minimum of Distortion**—Neither the work nor the cutting band is subject to machining stresses.

The fixtures need be only strong enough to hold the workpiece vertically without being deflected by the weight of the work. The machines are suitable for many applications involving thin, difficult to support material.

• **Series of Models Available** — DoAll supplies three models: 1612-X1, 3624-X1, and 2648-X1. They differ only in work capacity and accuracy. Cutting rates are the same.

The smallest, Model 1612-X1, is rated at 5 kw. It's designed for missile and experimental work and small parts. Model 3624-X1, rated at 7½ kw, is used for slabbing and rough machining honeycomb materials as well as for sectioning radiators and heat exchangers. The largest, Model 2648-X1, rated at 10 kw, is intended for work of exceptional size or that requiring precise dimension control.

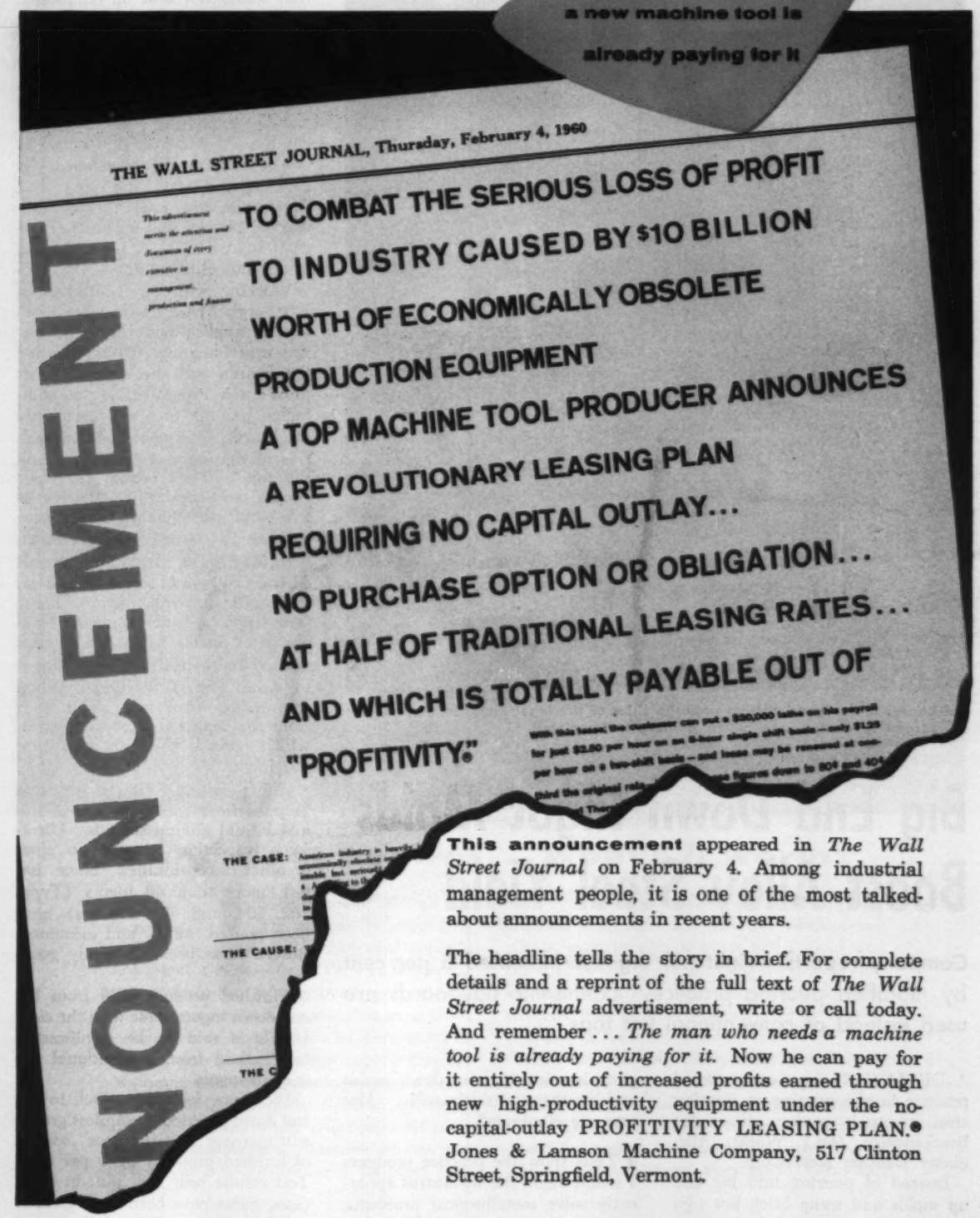
Cutting speeds vary with finish desired and the material being processed. The rate is 5 to 50 sq in. per minute for finely finished work, 150 to 200 sq in. per minute where finish is not important. Cutting rates for stainless steel honeycomb range from 50 to 100 sq in. per minute. For aluminum, the rate extends up to 150 sq in. per minute. Rates for zirconium and titanium are about the same as for stainless.

Flatness of surface achieved ranges from 0.003 in. total indicated reading at the lower cutting rates to 1/64 in. total indicated reading at the maximum rate of cut.

**• Win $1000 for your idea. Turn to Pages 5 and 6 for details.**

# JONES & LAMSON MACHINE COMPANY

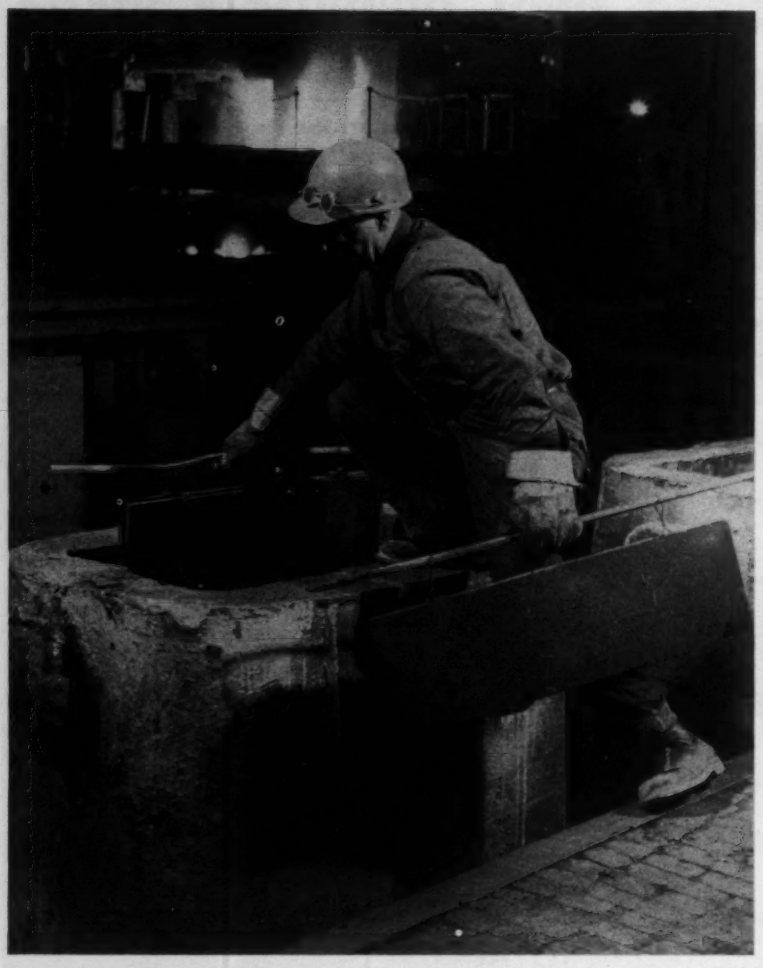
**the man who needs a new machine tool is already paying for it**


NOUNCEMENT
THE WALL STREET JOURNAL, Thursday, February 4, 1960
TO COMBAT THE SERIOUS LOSS OF PROFIT
TO INDUSTRY CAUSED BY $10 BILLION
WORTH OF ECONOMICALLY OBSOLETE
PRODUCTION EQUIPMENT
A TOP MACHINE TOOL PRODUCER ANNOUNCES
A REVOLUTIONARY LEASING PLAN
REQUIRING NO CAPITAL OUTLAY...
NO PURCHASE OPTION OR OBLIGATION...
AT HALF OF TRADITIONAL LEASING RATES...
AND WHICH IS TOTALLY PAYABLE OUT OF
"PROFITIVITY"
THE CASE:
THE CAUSE:

**This announcement** appeared in *The Wall Street Journal* on February 4. Among industrial management people, it is one of the most talked-about announcements in recent years.

The headline tells the story in brief. For complete details and a reprint of the full text of *The Wall Street Journal* advertisement, write or call today. And remember . . . *The man who needs a machine tool is already paying for it.* Now he can pay for it entirely out of increased profits earned through new high-productivity equipment under the no-capital-outlay PROFITIVITY LEASING PLAN.® Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

**Turret Lathes • Automatic Lathes • Tape Controlled Machines • Thread & Form Grinders • Optical Comparators • Thread Tools**



Sideboards are suspended from opposite sides of the ingot mold, so they will be submerged in molten steel when pouring is completed

# Big End Down Ingot Molds Boost Alloy Steel Yield

## Company reports weight per ingot is increased 5 per cent by modified pouring practice; exothermic sideboards are used instead of conventional hot tops

A DEVIATION from conventional practice in the pouring of stainless steel ingots is paying off at the Brackenridge (Pa.) Works, Allegheny Ludlum Steel Corp.

Instead of pouring into big end up molds and using brick hot tops to minimize piping defects, the company is using big end down molds and exothermic sideboards. Hot tops are eliminated.

**• Tests show the practice produces a sound ingot; the sideboards apparently solve metallurgical problems.**

In theory, stainless and other "killed" steels shouldn't be cast big end down; it had been thought that when liquid steel freezes, the pipe would position itself somewhere in the body of the ingot, causing a void that would not heal up on rolling.

Allegheny Ludlum's research proved that point, but Richard B. Shaw, general superintendent of melting operations at Brackenridge, liked the inherent advantages of big end down pouring well enough to gamble.

The sideboards, developed by Pittsburgh Metals Purifying Co., Pittsburgh, are made of an exothermic powder and a binder. Principal ingredients: A nitrate, ferric oxide, and aluminum.

Working with representatives of Pittsburgh Metals, who were looking for applications, Mr. Shaw began experimenting. First, he tried the boards with hot tops. That proved too expensive, so he eliminated the hot tops and used only the boards. He placed one on each side of the ingot mold and one on the top. Tests proved that two boards were nearly as effective as five—and considerably less expensive—so the others were discarded.

In May, 1959, Mr. Shaw suspended two exothermic sideboards (2 in. thick, 10 in. wide, 42 in. long) from opposite inner walls of an 8 ton ingot mold. Then molten steel was poured into the mold, filling it to within 1 in. of the brim. When the molten steel was about 1 ft from the top, it hit the sideboards, which ignited, throwing heat into the ingot.

After casting, the ingot was stripped from the mold, rolled into a slab, and ground smooth. Ultrasonic inspection revealed no pipes or other discontinuities. Since that test, more than 40 ingots (Types 302, 304, and 430 stainless) have been poured, rolled, and examined. Results have been uniformly good.

**• Finished product yield from big end down ingots made with the sideboards is said to be significantly larger than from conventional big end up ingots.**

Mr. Shaw feels the switch to big end down practice in stainless grades will increase "out the door" weight of finished products by 5 per cent. Test results bear that out; in some cases, gains have been even greater.

What it means in dollars and

# JONES & LAMSON "AUTOMATION"

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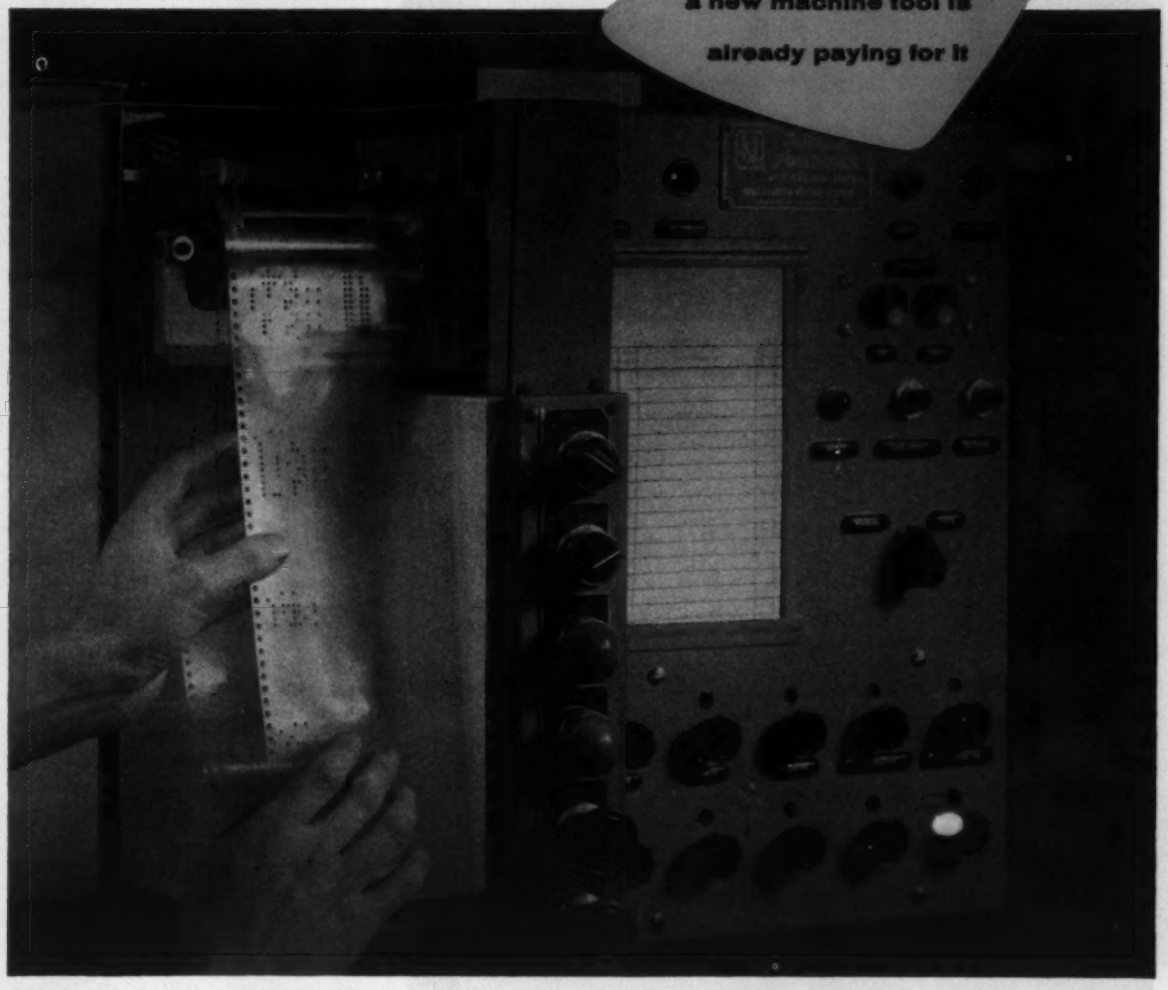

## Numerical Control . . . what's it worth?

What *about* numerical control: is it all it's cracked up to be? The answer, in a word, is "yes". Here's why. With numerical control, the *big* factor is *flexibility*. Tape or numerical programming can be employed economically for medium or small lot production, even down to *single pieces*. Accuracy is also increased. For instance, Jones and Lamson tape controlled positioning units hold tolerances of ±.001 on applications for punching, drilling, boring or similar operations where point-to-point positioning is mandatory. Machine set-up and change-over become primarily an office procedure. Numerical control of machining operations eliminates the need for cams, templates, even prototype parts and special fixtures. It results in greater machine utilization, and speeds actual machining. Lead time is reduced, and because human error is largely eliminated, accuracy is improved.

Any way you look at it, numerical control has come of age. It's being used more and more, simply because it produces better, at lower costs. For detailed information, write Jones & Lamson Machine Company, Dept. 710, 517 Clinton Street, Springfield, Vermont.

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**Big end down molds are used at Allegheny Ludlum's Brackenridge (Pa.) works. Faster pouring and stripping make for less heat loss and reduce soaking time**

**Molten steel ignites the sideboards, which are made of an exothermic powder and a binder. Heat added at the ingot top prevents pipes and other discontinuities**

cents: Say a steelmaker normally gets 10,400 lb of Type 304 finished cold rolled strip from an 8 ton ingot. A 5 per cent yield increase adds 520 lb. At a selling price of 55 cents a pound (not including extras), the gain amounts to $286.

**• Exothermic sideboards cost more per ton of steel produced than plain brick hot tops, but the switch to big end down ingot practice makes for longer mold life, Allegheny Ludlum says.**

In calculating costs, the company cites these: Sideboards for an 8 ton ingot mold cost $12 a set, or $1.50 per ton of steel. Plain brick hot tops for the same size ingot are $9.20 each, or $1.15 a ton. For 5 ton ingots, sideboards are $1.50 a ton and hot tops $1.35.

Several factors more than offset the slightly higher costs of exothermic materials, says Allegheny Ludlum. Mold life increases because big end down molds have no bottoms. They are poured on a cast iron stool, and the impact of the hot metal doesn't erode them so much. The stool is separate from the mold; any required stool repairs can be made readily. The plug hole doesn't have to be covered with a protective mat, which would cost $1 to $2.50, depending on whether the steelmaker or the fabricator supplies the metal.

Ingots that stick when molten steel undercuts the sides of the mold can be removed easily by pushing downward. In a big end up mold, they must be reamed out through the plug hole (that sometimes enlarges the hole, causing a leak). Ramming is sometimes ineffective, so the mold has to be broken.

Over a period of several months, Allegheny Ludlum's average mold cost per ton of steel was 43 per cent lower on 8 ton, big end down molds than on big end up molds. The 5 ton big end down molds were 25 per cent less expensive than their big end up counterparts.

**• The modified pouring practice and sideboards are said to offer other benefits.**

The sideboards save time and labor in pouring, says Mr. Shaw, and make a 125 ton crane, formerly used to lift hot tops, available for other work. They reduce the danger of leakers—hot tops that crack or allow molten metal to escape at the point where ingot and hot top meet. They prevent bricks from sticking to the top of the ingot, sometimes falling off in the soaking pit, necessitating periodic cleanups. And the boards reduce storage requirements by 90 per cent; space required for one hot top will accommodate enough sideboards for ten ingots.

Because the big end down ingots can be stripped faster, less time and heat are lost between casting and movement to the soaking pit. Result: Ingots need less reheating before rolling.

If further tests prove that it is economical to pour all stainless grades big end down, and if the switch is made to 100 per cent big end down practice, Mr. Shaw estimates that ingot mold inventory may be cut as much as 40 per cent.

# JONES & LAMSON MACHINE TOOLS

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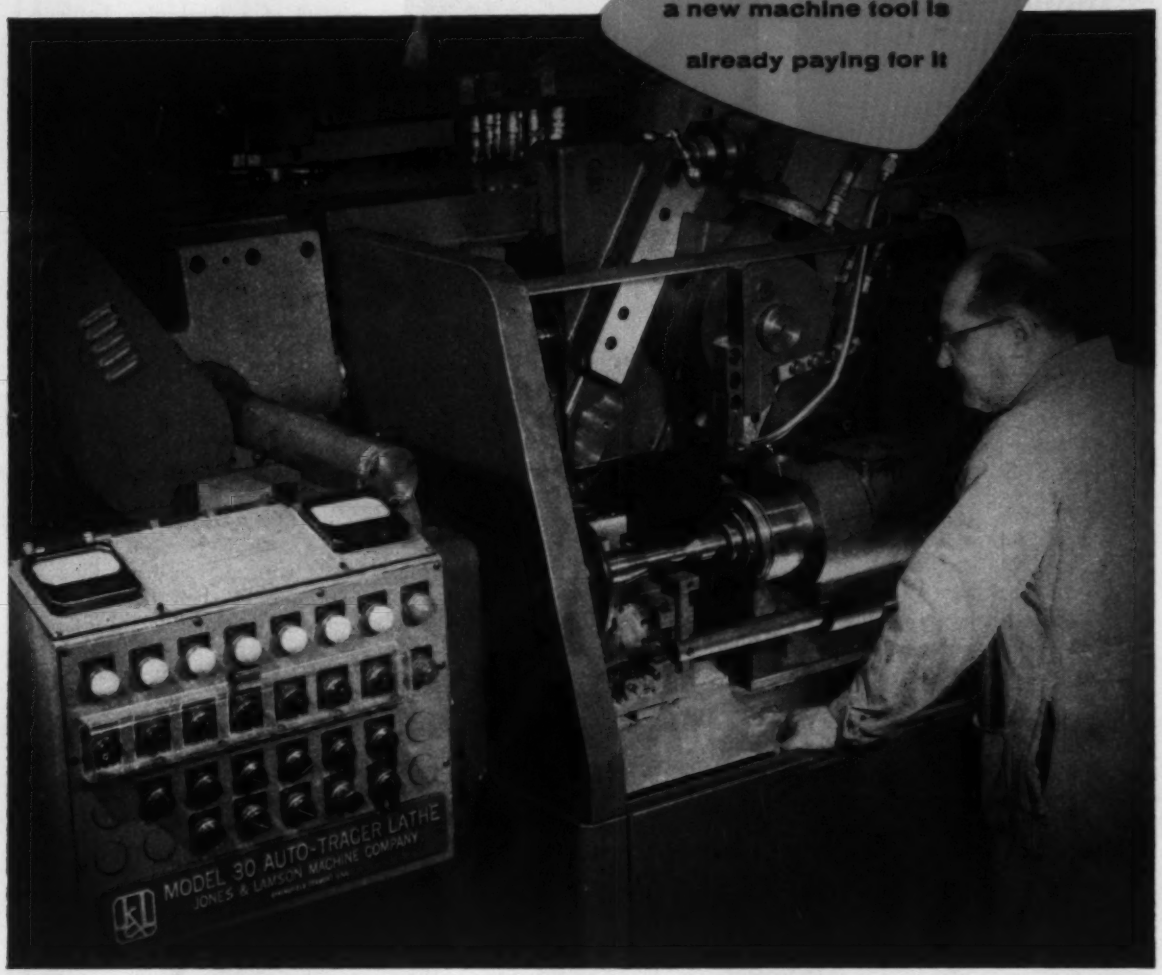


## Brand-new! A fully automatic tracing lathe

This new J & L Model 30 Fully Automatic Tracing Lathe combines a number of flexible designed features, *and it's competitively priced.* The basic J & L ingredients of extra ruggedness and extreme precision are apparent throughout. (Note the unusual solidness of the tracing slide, for instance.) Specifically, it offers 1. *Fast and flexible set-ups* which are extremely simple, and accessible to the operator, 2. *Compact and convenient controls* for push-button programming of the automatic cycle, 3. *Automatic speed and feed changes* during a cut, 4. *Work handling facilities* that can be either automatic or manual (there's plenty of room for chip disposal, too).

In addition, this machine will accommodate any one of three different rear slides. It also offers a choice of two different headstocks. Moreover, the stylus and template are high and dry.

Details and specifications are contained in our brochure No. 5810. Write for your copy. Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

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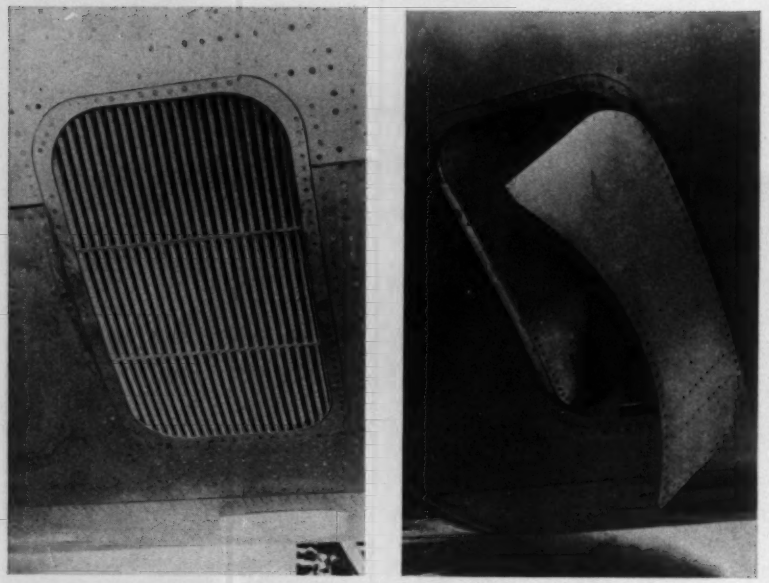

Diecast louver (seven parts) was substituted for aircraft exit door (38 parts). It improved the plane's performance and eased maintenance and assembly

# Simplified Design Eliminates 31 Parts

**With the new approach, an operating mechanism is replaced by a fixed assembly that has seven components—three diecastings and four assembly parts**

AN aluminum diecast louver for an air exit on the Electra paid off four ways, reports Lockheed Aircraft Corp., Burbank, Calif.:

1. Thirty-one parts were eliminated.
2. Flight performance and appearance of the plane were improved.
3. Door servicing, overhauling, and part storage were eliminated.
4. Performance requirements were met at a fraction of the cost of alternate designs.

• **The Parts**—The three-piece diecast assembly forms the exit louver of a Freon condenser tunnel. It provides in-flight and ground cooling and auxiliary ventilation for the prop jet.

Originally, exit doors were used to modulate air flow. To eliminate the elaborate door mechanism, Lockheed started to design a fixed exit louver that would provide a satisfactory balance between maximum percentage of open area, minimum air flow restriction, and optimum direction of air into the boundary layer.

As a result of initial design efforts, a diecasting was selected to produce the precise spacing, size, and shape of the louver vanes.

• **Fewer Parts** — The design has seven components (three diecastings and four assembly parts) vs. 38 previously. Labor requirements in assembly are greatly decreased.

## Employees Solve Problem By Building Welders

The plant staff at Reynolds Metals Co.'s Sheffield, Ala., facility got rid of a fabrication bottleneck by designing and building two special traveling gantry welding units.

The equipment, used to weld the girth of aluminum shells for Redstone missiles, has wrung both time and cost out of the job.

The two gantries straddle the shells and travel on 180 ft segmented tracks. Each unit has all the basic welding equipment needed to complete a girth weld.

The shells rest on matched friction driving wheels located at close intervals along the track. Rotation and welding operations are controlled by the operator from his console on the gantry.

The operator drives to his work point and positions his torch for the weld. As many as ten different points can be worked along the track, with the welder rolling into position only when the facing shells are fully prepared.

Because the driving wheels can be disengaged in 8 ft sections, setup and teardown can be carried on while welding is in progress elsewhere on the track.

• **Previous Method** — Formerly, it was necessary to tie up the girth welding unit for hours while aligning the shells and placing the heavy backup bars.

Plant Manager M. C. Duke comments: In addition to the increased speed and efficiency of the gantry units, they maintain precision and welding quality which would have seemed fantastic when the plant started to produce airframes for the Redstone.

## Alumina Goes Airborne

Guided missile nose cones constitute a dramatic new market for alumina, the white oxide used to make aluminum. Aluminum Co. of America, Pittsburgh, says the material is being fashioned into cones for the Navy's Sparrow III air-to-air missile. High strength, resistance to thermal shock, and the ability to pass radar waves without distortion are given as the material's strong sales points to missilemakers.

# JONES & LAMSON
# OPTICAL COMPARATORS

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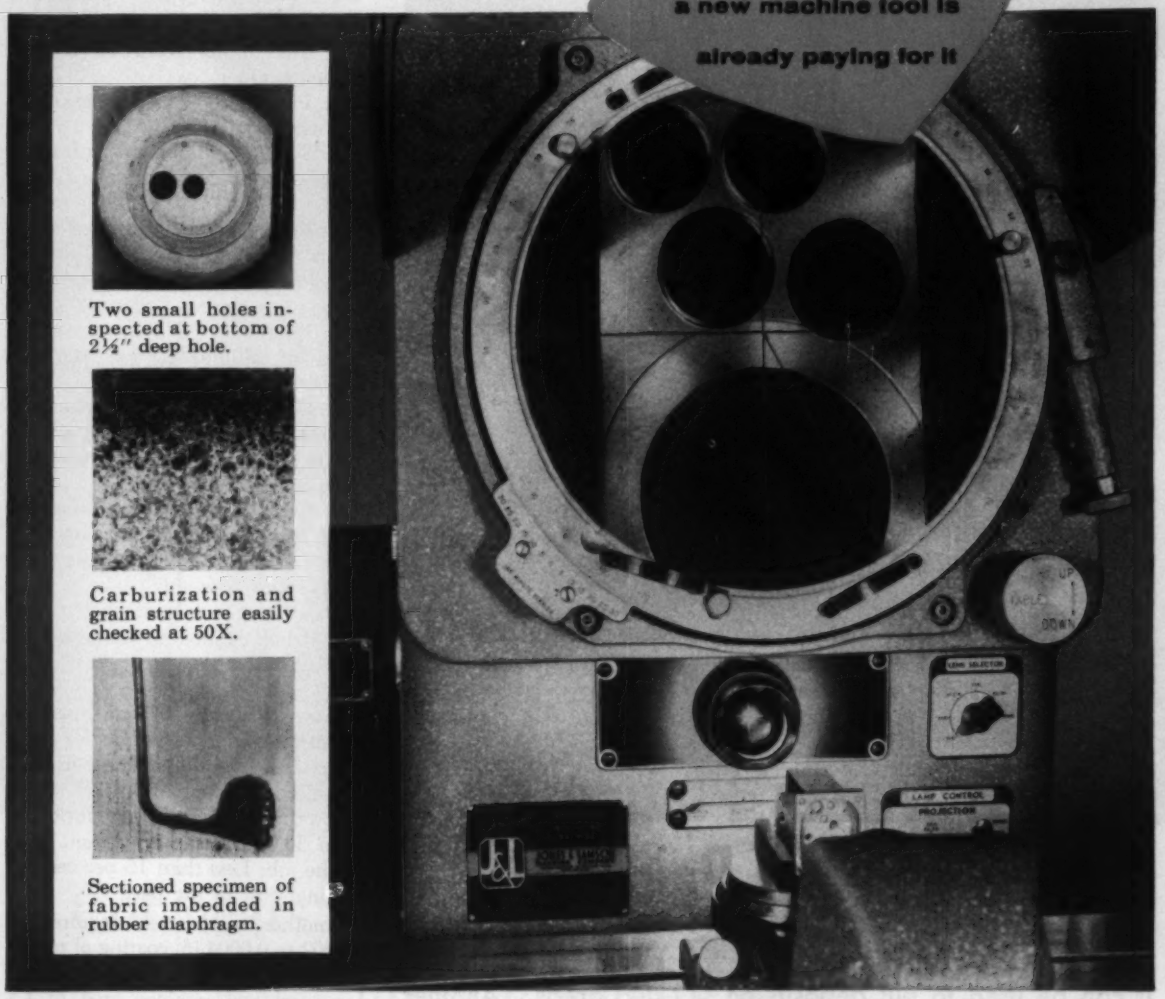
Two small holes inspected at bottom of 2½" deep hole.



Carburization and grain structure easily checked at 50X.



Sectioned specimen of fabric imbedded in rubber diaphragm.



## New reflection unit makes "tough" inspections easy

Now, users of J & L FC-14 and TC-14 Optical Comparators can easily and accurately inspect cast materials, deep holes, and penetration of heat treat, and can make their over-all inspection operations more efficient than ever before.

J & L's new Normal Reflection Unit, shown here, is designed to produce the maximum amount of reflectivity, *regardless of the surface finish of the part being inspected.* This new unit gives brighter-than-lifelike images, with clean, razor-sharp definitions, without heat and without distortion.

This revolutionary development makes it possible to inspect by reflection and by projection simultaneously. Reflection can be directed from above, below, or either side. Effective light is increased at least 55% by means of a spherical reflector, which concentrates and redirects light into the optical system.

With J & L's True Telecentric Lens System, depth of focus of up to .100" can be obtained. And the image does *not* change size during focusing! The entire unit, is externally mounted to isolate convected heat from the optical system.

Write for free, illustrated folder LO-5918. Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

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**The throws on this crankshaft are being built up by applying a thin coat of nickel. Deposit thickness is controlled by the ampere-hour meter on the power pack**

# Process Makes Plating Comparable to Painting

**It can be used to put deposits on selected areas. Another advantage: Assemblies do not have to be dismantled. One application: Reclaiming worn or mismachined components**

YOU can electroplate with the Dalic process by rubbing the workpiece with a saturated anode pad. No immersion tanks are used.

Advantages: 1. You can quickly plate selected areas on a part. 2. Parts can be plated without disassembly. 3. The equipment is mobile: It can be taken to the job.

Licensing rights (for U. S. and Canada) are held by Sifco Metachemical Inc., a subsidiary of Steel Improvement & Forge Co., Cleveland.

• **The Process**—Before plating, surfaces are prepared with electrocleaning or etching solutions followed by a water rinse. In the process, the plating surface is made cathodic. Thickness can be controlled within 0.0001 in. by the ampere-hour meter on the power pack.

Most soft metals can be plated to any thickness, says Sifco. For other metals, a sandwich type lamination can be used to build up the plating. Plated surfaces can be bent, twisted, heated to their softening point, and quenched with no flaking or peeling. Deposits range from a semibright to a dull finish, depending on the metal and plated thickness. The surface can be buffed to a luster.

• **Uses**—A number of applications are listed by the firm, including:

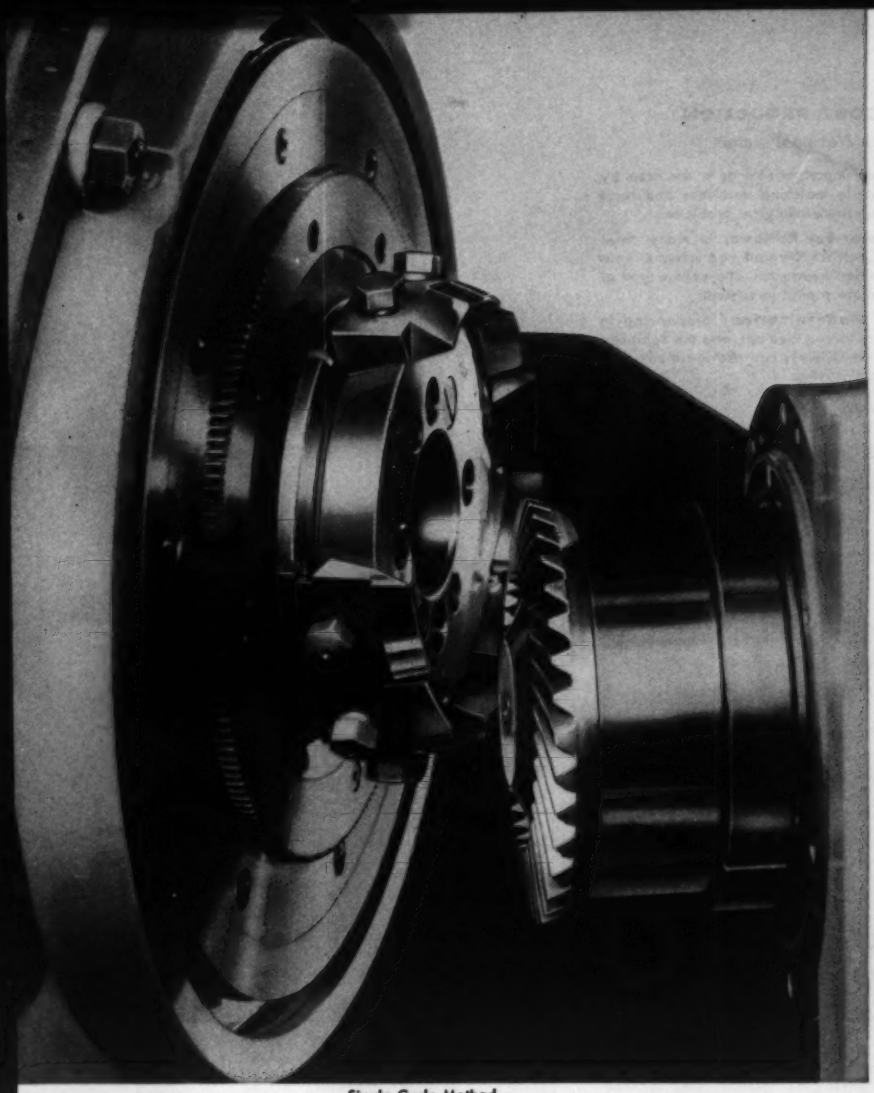
1. Reclaiming worn or mismachined components.
2. Plating controlled areas without extensive masking.
3. Selective stopping-off of small areas prior to carburizing or nitriding.
4. Fitting bearings to close tolerances.
5. Prevention of fretting corrosion by plating mating surfaces.
6. Improving soldering characteristics of aluminum and stainless steels.
7. Gold and rhodium plating of assembled electrical contacts for increased conductivity and wear resistance.
8. Plating isolated sections on large or assembled components.
9. Touching up plated areas damaged during assembly.
10. Plating metals attached to material that cannot be immersed in plating baths.

• **Case Histories**—In one instance, undersize compressor shafts for commercial refrigerators were salvaged by selectively applying nickel to the throws. The shafts were fabricated from 30,000 tensile gray iron. Cost of the job: Less than 15 per cent of original cost of the part.

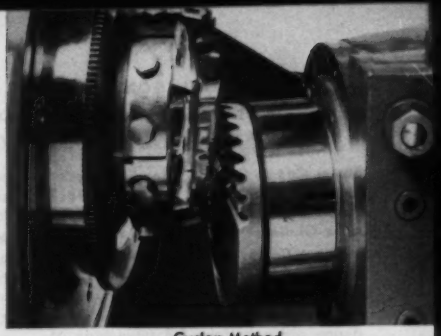
Another application required a 0.0002 to 0.0004 in. coating of nickel plate on the center bore of a stainless steel seal retainer used in an aircraft fuel pump. The job was done at 15 cents a piece. No masking or stopping was necessary.

About 150 valuable missile and aircraft parts were salvaged at Goodyear Aircraft Corp. (Akron) by building up a fine grained deposit of nickel. The parts were unusable due to wear and damage. The company also uses the plating method in other engineering and production jobs.

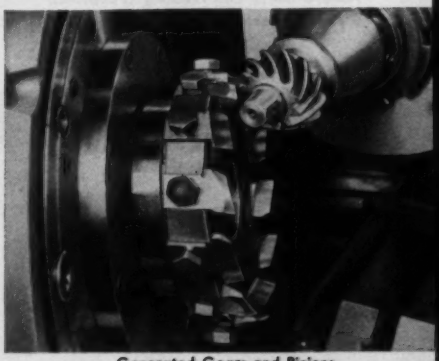
Fuel injection nozzles for aircraft turbine afterburners were given a 0.0004 to 0.0006 in. plating of nickel on the inside diameter and chamfer, making it possible to gold braze the 300 Series stainless nozzle to the fuel line.



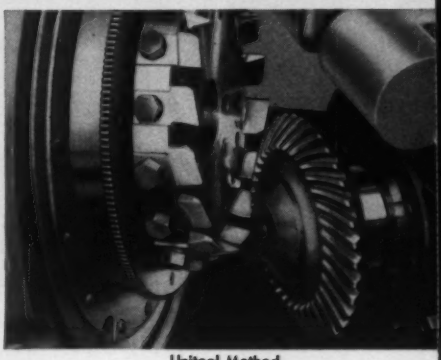
Single Cycle Method



Cyclex Method



Generated Gears and Pinions



Unitool Method

# Cut gears with *four* different methods on *one* machine

If you expect your gear needs to change over the years you'll appreciate the exceptional versatility of the Gleason No. 108 Hypoid Generator. With this one machine you can cut both gears and pinions by four different methods:

**Single Cycle® Method.** Using this method you can cut nongenerated gears four to five times faster than previously possible on machines of this type. Cradle and work head are locked in position. The last rotation of the Single Cycle Cutter finishes both sides of a tooth space. You cut the mating pinions on the same machine using the conventional single-roll Generating Method.

**Cyclex® Method.** For certain applications you can use the extremely fast Cyclex Method on the No. 108 Generator. You cut nongenerated gears in one completing operation from the solid blank.

**Generated Gears and Pinions.** You can produce both gears and pinions on this machine with the Generating Method. Here, a relative rolling motion takes place between gear or pinion and the rotating cutter.

**Unitool* Method.** If you want to cut small quantities of spiral bevel, Zerol® bevel, or hypoid gears with a minimum of tooling, you can use the Unitool Method. You cut both gears and pinions with a single cutter. This method is particularly useful for experimental gears for prototype work.

The No. 108 Generator cuts gears up to 8½" diameter at a 10:1 ratio and to a maximum of 4 DP. You can get the same versatility in cutting larger gears with the No. 118 Hypoid Generator which handles gears up to 18" diameter, 10:1 ratio, to a maximum of 2 DP. A third model, the No. **28** Hypoid Generator, cuts gears up to 33" diameter at 10:1 ratio, 1½ DP.

Send for free bulletins on all three machines.

*Trademark

**GLEASON WORKS**

72

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.

**NATIONAL ACME'S "ZONE OF RESPONSIBILITY"**
**INCLUDES ALL PHASES OF COST REDUCTION**
*Check YOURS . . . Then Check National Acme*

**Direct Costs:** these include direct dollar savings as realized by the McCulloch Corporation . . . an "every day" job for Acme-Gridleys.

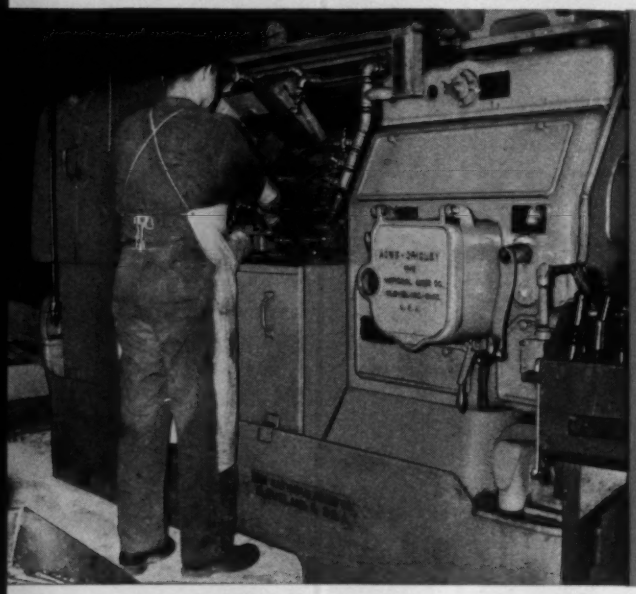
**Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

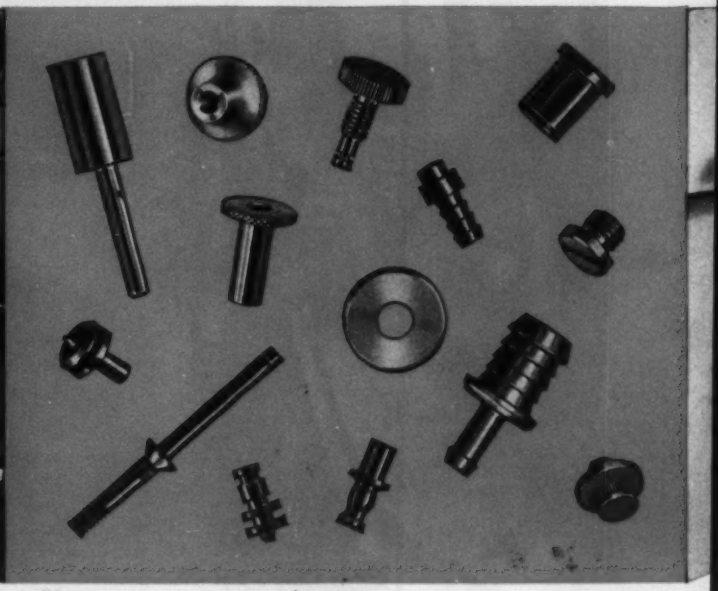
**Product Redesign:** teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

**Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

**Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

**Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.





# McCULLOCH CORPORATION LOGS 66% COST REDUCTION

*. . . with Acme-Gridleys*

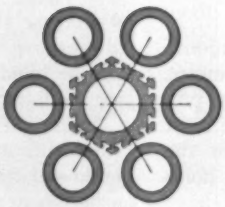
Reduced cost-per-piece of tilt-lock knobs was but one of the enviable savings made possible for the Marine Products Division of the McCulloch Corporation by an Acme-Gridley RA-6 Spindle Automatic. In addition, McCulloch boosted output 200%, practically eliminated scrap losses, and greatly improved finish and final appearance of this small but critical part.

Previous production methods required one primary and two secondary operations. Now, complete machining—including deburring, is done in one automatic operation on the Acme-Gridley.

Dramatic savings in the production of parts like this make Acme-Gridleys a vital, cost-saving cog in McCulloch's highly efficient production set-up. Evidence of this leading manufacturer's high regard for Acme-Gridley efficiency is the fact that 14 different parts for their popular 60HP "Flying Scott" are produced on the rugged, versatile RA-6 Automatic.

It will pay you to thoroughly study the savings possible with Acme-Gridleys. Call, write or wire for complete details on industry's most modern approach to tangible cost reduction.

Pioneer in Circumferential Automation

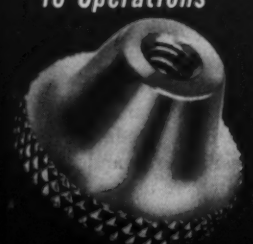


**National Acme**

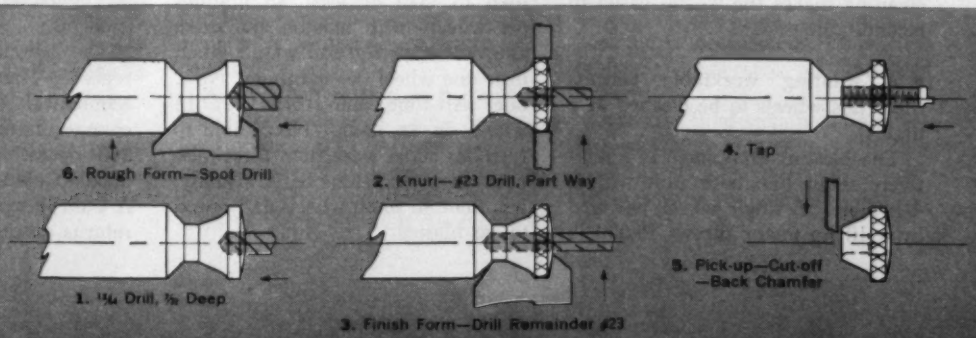
The National Acme Company
189 E 131st Street
Cleveland 8, Ohio

**Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.**

*10 Operations*

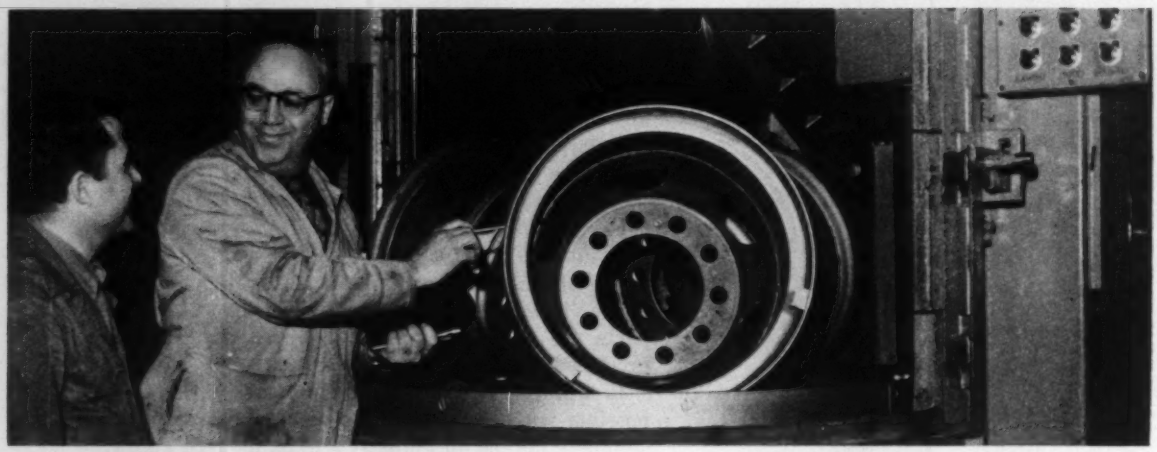


*in 5 Seconds*


6. Rough Form—Spot Drill
2. Knurl—#23 Drill, Part Way
4. Tap
1. 1¼ Drill, ⅝ Deep
5. Pick-up—Cut-off —Back Chamfer
3. Finish Form—Drill Remainder #23

# Blast Cleaner Speeds Maintenance Chore

*Rusty bus wheels are loaded onto worktable of this small unit . . .*



*And returned for final reconditioning steps in 10 minutes*

BLAST CLEANING to remove rust and scale from some types of parts is one way to hold down maintenance costs.

Example: Wheels taken from buses operated on transit lines in Toronto, Ont., are blast cleaned 18 times faster compared with hand methods. Added benefit: Better cleaning makes the wheels easier to recondition.

**• A rotating worktable permits three bus wheels to be cleaned at a time.**

The blasting equipment is a relatively small Pangborn unit with a 4 ft table. A single wheel, powered by a 10 hp motor throws 15,000 lb of abrasive an hour.

Most bus wheels at the Toronto shop are 20 to 22 in. in diameter, weighing 80 lb. As a safety precaution, paint, rust, and scale must be removed periodically from the shoulders where the lock ring holds the tire.

Hand scraping and wire brushing used to take at least 35 minutes per wheel—with moving and extra allowances, production wasn't much over one wheel per manhour. Now, one part-time man turns out 18 wheels in an hour. He is able to turn out better work than three men used to on a full-time basis. Usually, less than 40 to 50 wheels daily need to be blasted.

**• Because the cleaning unit is an all-purpose type, a variety of jobs can be handled and multiple setups are eliminated.**

Operation is partly automatic. After the operator loads the worktable and closes the door, he pushes a button to start the cycle. Abrasive flows, cleaning proceeds for a preset period and the machine shuts itself off.

The Toronto Transit Commission reports: The equipment has been economical to operate. No vane changes have been necessary after 360 operating hours. Not much makeup abrasive has been needed. A built-in system cleans, sorts, and returns good abrasive for re-use.

## Plastic Cuts Repair Costs on Leaky Pipes

Maintenance costs of about $2400 have been saved by Auto-Owners Insurance Co. in a four story building it occupies at Lansing, Mich., as a result of using a new plastic for sealing leaky pipes. The material, Ren Shape, is a smooth resin paste which can be mixed with a hardener and prepared on the spot. It's made by Ren Plastic Inc., Lansing, Mich.

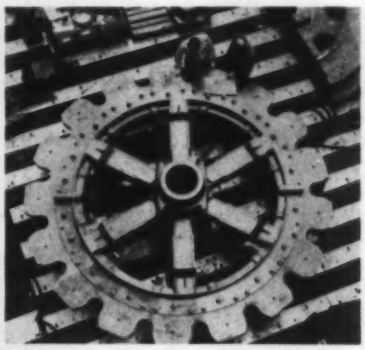
The problem confronting John R. Waldes, building engineer, was frequent leaks in 10 year old copper pipes used for heating and cooling (180° F in the winter, 40° F in the summer). Cost per leak totaled about $200 (including overtime, cost of materials, and replacements costs).

Overtime was necessitated by work at night or weekends when the building was empty because the system required draining.

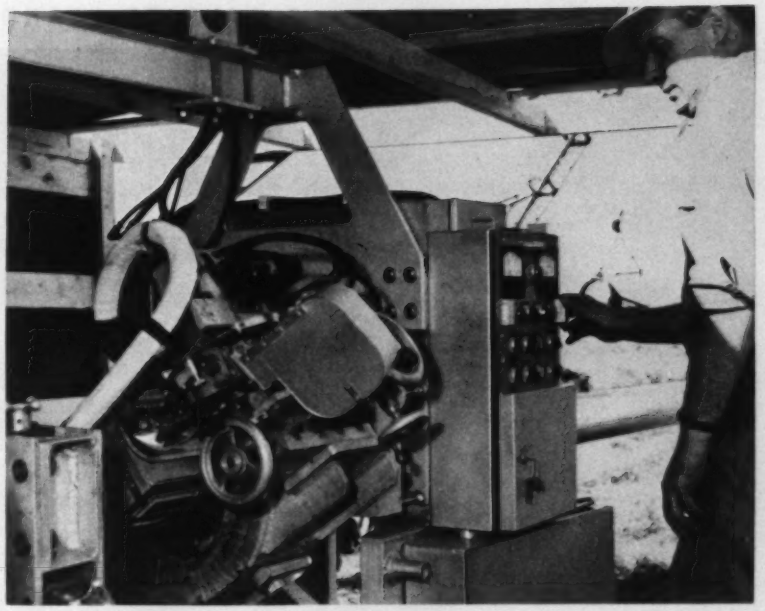
Now, claims Mr. Waldes, the operation takes less than 1 hour from the time the leak is discovered to clean the pipe, mix the material, and place it on the pipe.

Overtime has been eliminated because the application can be made without shutting down the system, provided the fluid pressure can be reduced to eliminate dripping during the repair operation.

Greater savings are claimed for threaded pipe systems since repairs can be made on the joint without going back into the union or cutting into the line to correct the leak.



**SPROCKET,** fabricated by Dravo Corp., Pittsburgh, will be used in an ore sintering plant under construction at Aliquippa (Pa.) Works, Jones & Laughlin Steel Corp. The machine will have a 13 ft 2 in. strand



**Alcoa's new automatic pipewelder completes joints in special tubing. Extra thickness at joints compensates automatically for decrease in parent metal strength caused by weld heat**

# Tapered Ends Add Strength, Cut Cost of Aluminum Tube

A NEW kind of seamless aluminum tubing could chop as much as 20 per cent from the cost of welded aluminum structures, says Aluminum Co. of America, Pittsburgh.

The secret lies in the wall of the tube which is thicker at the ends. That automatically compensates for the drop in aluminum tensile strength caused by welding heat.

Made of 6061-T6 alloy, thickness at the ends is 0.432 in., tapering down to 0.272 in.

**• A pipeline test is expected to show the tubing can withstand the corrosive effects of wet soil without benefit of wrapping or protective coatings.**

A mile-long section of 6 in. line has been installed at Cameron, La., for Columbia Gulf Transmission Co., a subsidiary of Columbia Gas System Inc. The line links a Louisiana natural gas well with Columbia's gathering system in that area.

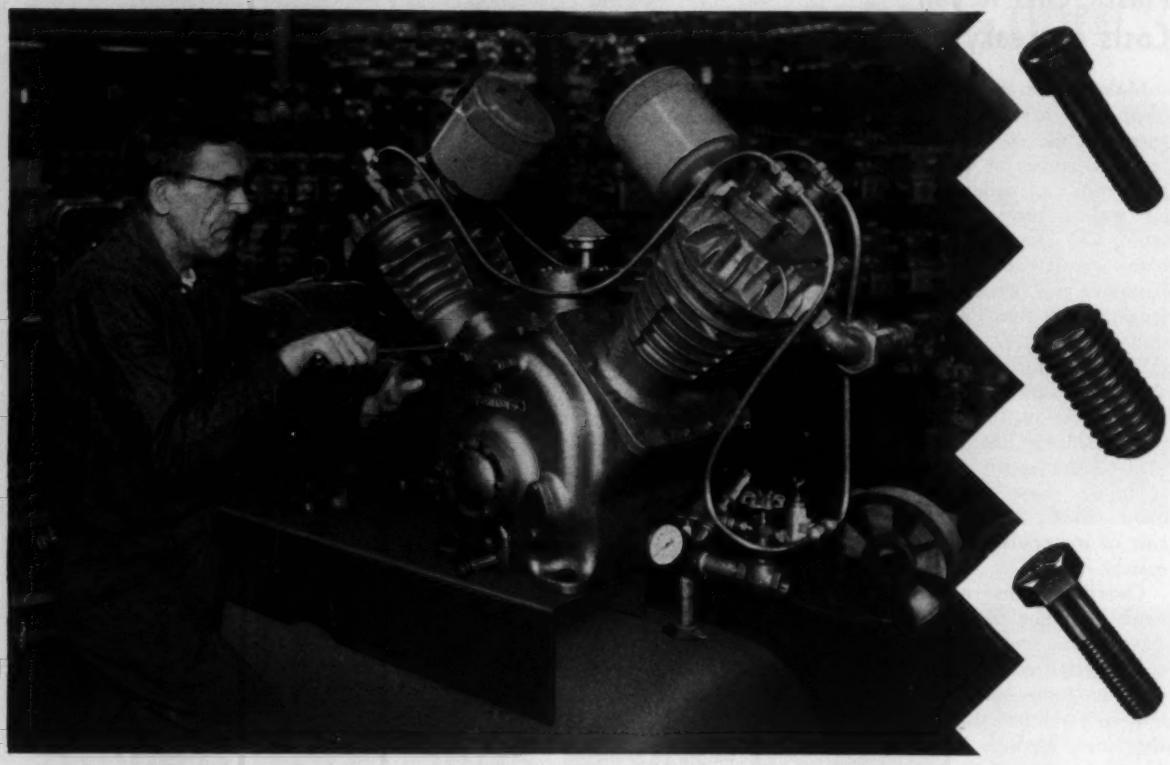
A removable 8 ft section in the aluminum pipe will permit regular, thorough inspections. The test is but one phase of a program to evaluate aluminum for underground structures.

**• Welding was done by manual tungsten arc (Tig) and Alcoa's new consumable electrode, automatic pipewelding machine.**

The automatic device is similar to others available for pipeline construction (STEEL, May 4, 1959, p. 96). It produces sound welds with full penetration without weld backup, claims Alcoa. The machine does much to relieve a chronic field problem: Shortage of qualified welders.

After the final section of the pipeline was joined, it was tested hydrostatically at 1250 psi. Gas is normally moved through the line at 1000 psi.

IT PAYS TO STANDARDIZE ON STANSCREW



# Stanscrew provides faster service, adds safety for BRUNNER SINCE 1906 compressors

The fasteners this man is tightening must be really dependable. Dunham-Bush, therefore, maximizes the safety margin for its Brunner line by standardizing on Stanscrew heat-treated cap screws for all critical applications.

With tremendous production demands on its Hartford plant due to industry's preference for Brunner compressors, Dunham-Bush also demands a supplier who provides quick assistance on all occasions, and moves especially fast in emergencies. Stanscrew meets these requirements because complete stocks are maintained at three conveniently located plants . . . plus a management philosophy which looks on shipments within 24 hours as normal procedure, subject to drastic improvement in emergencies.

Fast delivery and reliable products are but two of many reasons more and more industrial leaders are switching to Stanscrew. A complete selection of over 5,000 different standard fasteners . . . experienced fastener specialists to provide qualified technical assistance . . . these and many other factors underline the advantages of specifying Stanscrew for your fastener requirements.

*Why not call your Stanscrew distributor today. He will gladly arrange a prompt visit from the Stanscrew specialist who can often save you money . . . for example, by substituting a standard fastener for a costly special.*

**STANSCREW FASTENERS**

**CHICAGO** | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
**HMS** | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
**WESTERN** | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

**STANDARD SCREW COMPANY** 2701 Washington Boulevard, Bellwood, Illinois

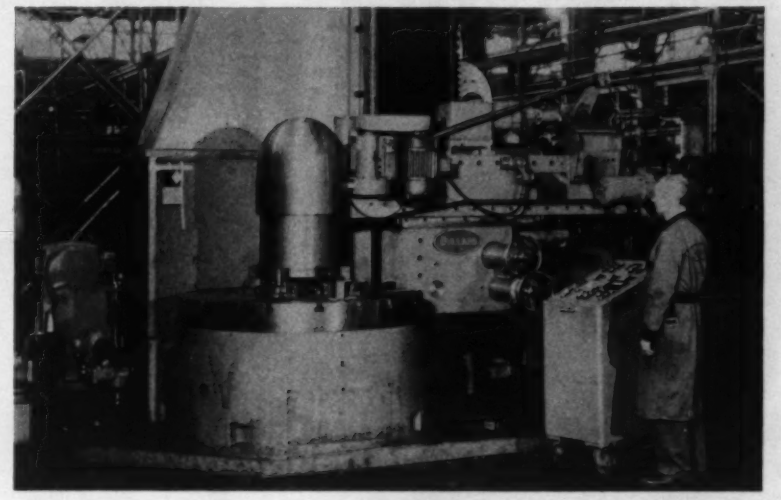
# Single Head Contour Grinder Has Tracer Control

PRECISE linear and nonlinear contours of convex surfaces are simplified with Bullard's single head grinder. The unit has GE tracer control and automatic swiveling.

In addition to line contact, external surface grinding, the unit can also do internal grinding (straight surfaces only).

The grinding unit (including the drive motor) can be removed and cutting tools substituted to do contour machining with the same tracer control and automatic swiveling. A separate toolholder permits internal boring to 48 in. in depth.

For further information, *write* Bullard Co., Canfield & Key Streets, Bridgeport 9, Conn.

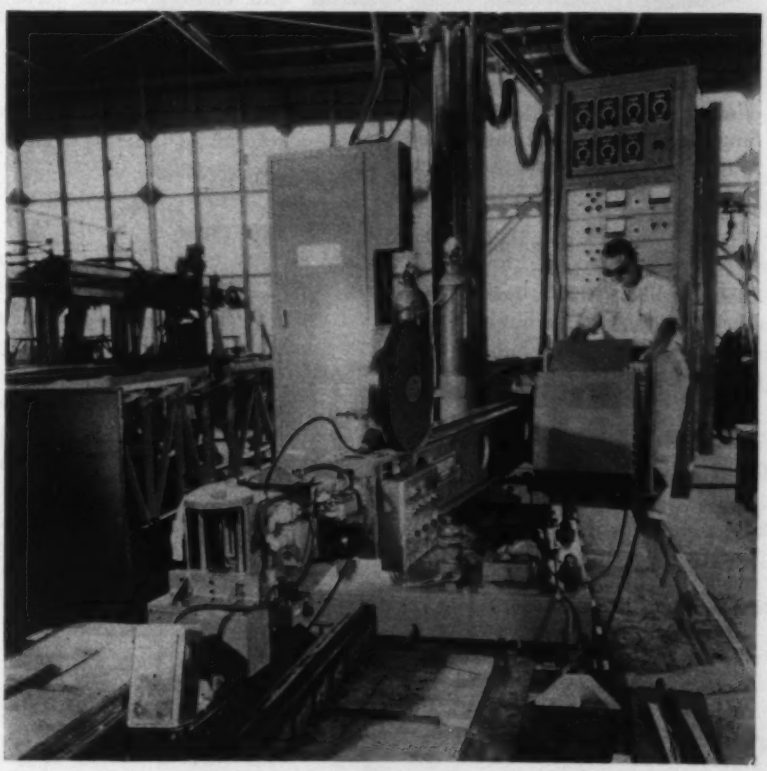


# Automatic Tig Fusion Welder Has 12 ft Weld Length

HIGH heat resistant, heat treatable alloys in various configurations can be welded by the automatic, boom manipulator, fusion welders built by Sciaky. The unit can weld in any position (through a complete circle).

Movements include in and out motions of the main boom, 360 degree torch rotation and fine horizontal or vertical head adjustments on the torch face plate. The boom can rotate a full 360 degrees about the main column, and up and down the same column (from 3 to 10 ft above floor level).

Extension of the main boom permits an effective weld length up to 12 ft. Internal circumferential welds can be made automatically down to a 20 in. duct. Special step weld controls automatically change weld settings as material thickness changes. Complete welds of uniform penetration are consistently produced. A closed circuit TV monitor permits the operator to observe a weld in process. The camera is at the extreme end of the boom. A seam tracking device maintains alignment of the torch. It senses a butt joint, and traces the

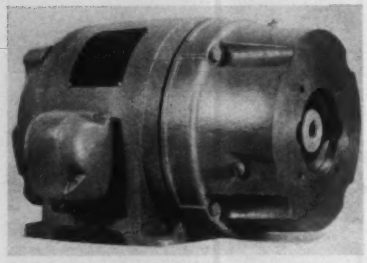


seam as the head moves. A proximity transducer mechanism maintains correct spacing between torch and workpiece.

For further information, *write* Sciaky Bros. Inc., 4915 W. 67th St., Chicago 38, Ill.

## Hydraulic Pump Motor Rated From ¾ to 50 hp

A MOUNTING bracket on the H-7 hydraulic pump motor eliminates the mounting base, complicated adapters, and reduces the over-all length of the close coupled pump-motor package. The cast iron frame also provides strength and rigidity needed for the support of the pump and motor.



Additional couplings are not required. A rigid, splined coupling allows direct pump connection. Single and double end models are available to fit all standard hydraulic pumps. You can get ratings from ¾ to 50 hp.

For further information, *write* U. S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif.

## Fork Type Truck Designed For Small, Low Pallets

YOU CAN move and handle loaded pallets and skids in small confined areas with the new BT fork type truck. The unit is designed for small, low pallets or skids (minimum required clearance: 3¼ in.).

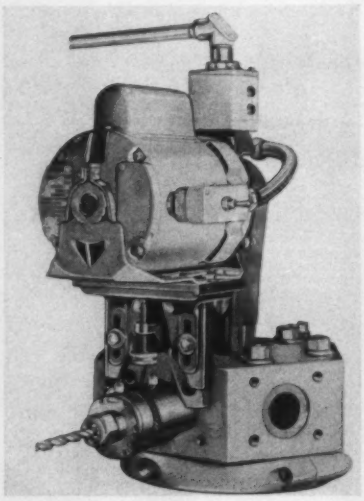
The hydraulically operated truck can lift and move loads up to 4400 lb. It's equipped with fully encased steel wheels, SKF ball bearings, and can pivot 90 degrees in either direction. Fork width is 16 in.; fork

length 30 in. It's ideal for single or double face pallets with two or three stringers.

For further information, *write* Industrial Handling Equipment Co. Inc., 1225 W. Monroe St., Chicago 7, Ill.

## Deep Hole Drilling Unit Designed for Lathes

A DEEP hole drilling attachment for turret lathes is capable of great speed and accuracy. The adjustable, self-contained unit fits into any hole on the turret without interfering with other positions. The rotating electrical power lead (360 degrees) avoids entangling the lead cord. Capacity goes up to a 1 in. diameter drill in steel.



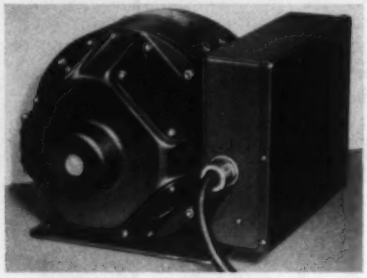
It's powered by a ¾ hp motor (1725 rpm). Power requirements are 110 volts, single phase, 60 cycles or 220 volts, three phase, 60 cycles. A timing belt drive permits variable speeds of 1150, 1725, 2490, and 3740 rpm.

For further information, *write* Boyar-Schultz Corp., 2000 S. 25th Ave., Broadview, Ill.

## Integral ac-dc Motors Rated up to 7½ hp

A LINE of integral horsepower ac-dc motors (developed by Robbins & Myers) is suitable for mobile field equipment or other ac-dc uses.

The line is available in ratings through 7½ hp in 1800 and 1200 rpm speeds. The design uses standard, open ventilated motors, packaged with four silicon rectifiers in



a bridge circuit that does not require reconnecting for each current. The unit is protected by quick blow fuses and with series or compound wound fields to place inductance in series with the armature.

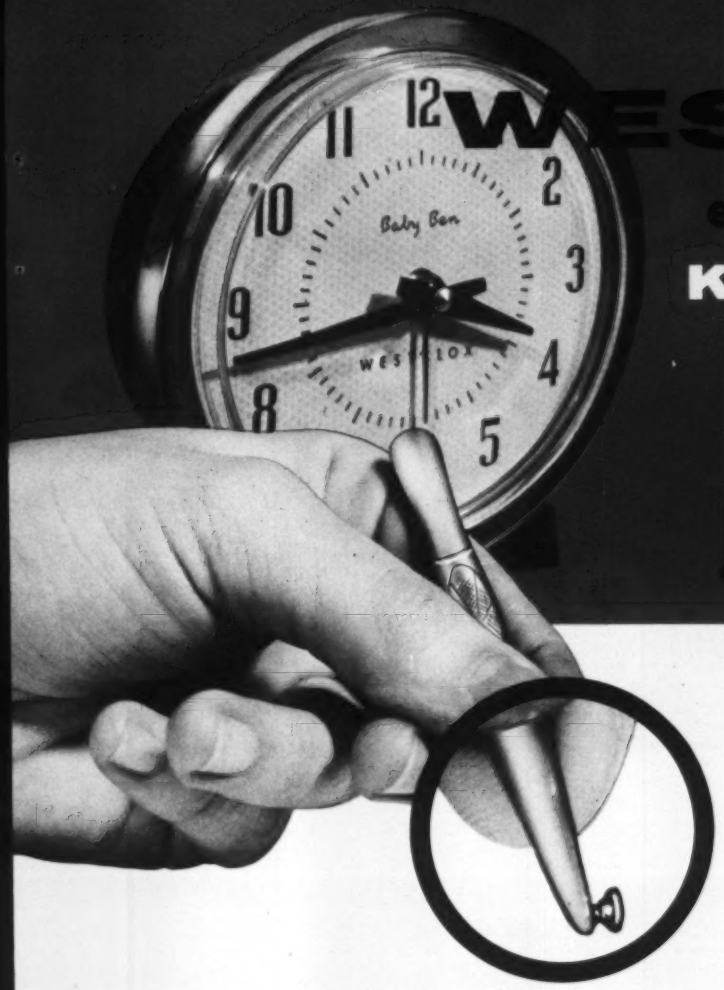
For further information, *write* Industrial Motor Div., Robbins & Myers Inc., Springfield, Ohio.

## Variable Speed Drive Has Linear Speed Control

A CAM CONTROL for the Graham infinitely variable transmission provides equal speed changes for equal increments of control adjustment. It maintains high accuracy setting and holding of speed over a range from any desired maximum to zero (reverse if desired).

A roller carrier, fixed to the motorshaft, supports three tapered rollers which are engaged by an encircling traction ring. Pinions on the large end of the rollers engage a ring gear joined to the output-shaft. To change speed, the traction ring is moved lengthwise to engage the rollers at varying diameters. Once set, the transmission

# WESTCLOX extends die life with KEYSTONE WIRE



From precision parts—such as these fasteners made from Keystone "XL" Wire—come the quality that has made WESTCLOX the most famous name in timepieces.

The Westclox Division of General Time Corporation, LaSalle, Illinois, is the world's largest manufacturer of timepieces. For years, millions of their famous Big Ben and Baby Ben clocks have started the day for more people than any other timepiece.

Keystone "XL" Wire has played a key part in "clockwork" cold heading of the millions of tiny fasteners—rivets and screws—that are a part of the "works" inside. From small .032" to .116" Keystone wire, some 170,000,000 fasteners are headed in a year. Precision of such tiny parts is important for high-speed assembly of quality timepieces.

Fifteen years ago Keystone metallurgists were called in at Westclox . . . analyzed wire use . . . die design . . . and recommended a wire that solved an excessive die wear problem. Today, one special carbide die at Westclox has headed an estimated 4-million parts . . . and is still in use after 12 years of operation. Keystone "XL" Wire is the big favorite on Westclox fastener heading today.

The *flowability* characteristic of Keystone "XL" Wire is the secret of success . . . it's a wire that practically "flows" through dies to form the most extreme shapes . . . with less die wear . . . greater precision . . . reduced waste.

Want a Keystone Wire Specialist to help you save money and improve quality? Write for details!

*Keystone Steel & Wire Company, Peoria 7, Illinois*

KEYSTONE XL WIRE STUDY

**KEYSTONE**

**WIRE FOR INDUSTRY**

# "HOW CAN DU PONT PAINTS CUT YOUR MAINTENANCE COSTS 50%?"

Ask Larry Schmeig. Larry's a member of Du Pont's special technical service group, specifically trained to help you solve your maintenance painting problem. As he puts it:

"When you're talking economy in maintenance painting, initial cost per gallon is a small part of the total picture. Much more important, in terms of real savings, are maximum efficiency of application and length of time the paint job lasts. As a matter of fact, in a recent 7-year period we were able to cut painting costs at Du Pont 50% —for a net saving of more than $1,000,000.

"Can you effect this kind of saving? Certainly. You see, we work right along with your maintenance men, to help you reduce costs every step of the way. First, we make a thorough analysis of your particular maintenance problem. Then we recommend the exact surface preparation, priming and top-coating to fit your needs. Finally, we draw on our experience to offer you expert guidance in efficient methods of application. The result: finishes that are tough, durable, right for the job—*at lowest cost per square foot per year.*"

For complete information on how you can cut paint maintenance costs while improving your plant's appearance, contact your Du Pont Technical Representative. Or write: E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Dept. S-63, Wilmington 98, Delaware.

* * *

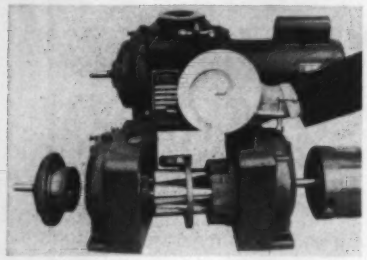
L. G. Schmeig began his career in Du Pont's Sales Service Laboratory 24 years ago, after completing his education at Temple University. Five years later he became a Du Pont Technical Representative servicing company-owned plants. Since then, he's been busy solving painting problems for architects, engineers and maintenance men in the fields of petroleum, marine, utilities and heavy chemicals. In 1958 he took over as Southwestern District Manager, Industrial Maintenance Sales.

DU PONT PAINTS

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

## NEW PRODUCTS and equipment



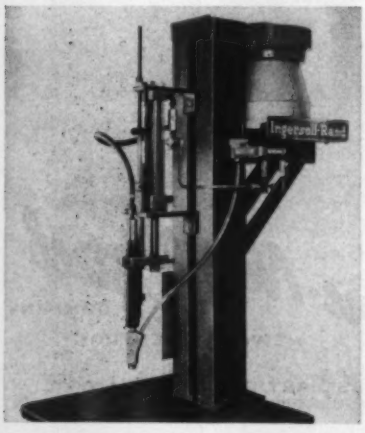
holds speed with change in load. Transmission speed can be regulated while in operation.

You can order the transmission with or without a motor. It can be furnished with built-in spur reducers having a parallel shaft extension or with worm reducers with right angle extension. Remote mechanical, electrical, or pneumatic controls may be specified.

For further information, *write* Graham Transmissions Inc., East Avenue, Menomonee Falls, Wis.

## Automatic Screw Driver Has Three Power Ranges

SCREW patterns on the R-A-F screw driver can be quickly changed by loosening and tightening two bolts per power head. Three Multi-Vane air motors each provide a different power range for precise torque control. The motors run to stall in each range. Power heads can be placed as close as 2 in. on centers and can be added or removed easily. The driver can be adapted to many special hard to feed screws. Standard vibratory or barrel feeders are used. Each feeder will handle up to four power heads.

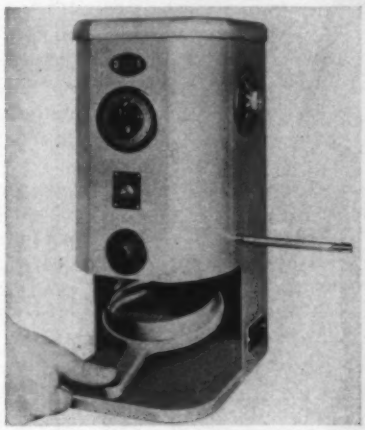



Throat depth ranges from 8-5/32 to 14 in. from center line of power head to column. The power head stroke is adjustable up to a 6 in. maximum.

For further information, *write* Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

## Moisture Content Checked In Minutes by Tester

MOISTURE content of sand, ceramics, chemicals, and other materials can be determined in minutes with the No. 277 Moisture Teller. The unit is designed primarily for intermittent duty where fast drying is important.



It has fast heating and high static pressure. A high speed blower is used.

For further information, *write* Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4, Mich.

## Dry Lubricant Effective From -300 to 500° F

A DRY lubricant called Perma-Slik gives effective wear protection at pressures as high as 50,000 psi. The material is a compound of graphitized molybdenum disulphide in a sprayable suspension. It can be used from −300 to 500° F, comes in a pressurized container.

For further information, *write* Everlube Corp. of America, 6940 Farmdale Ave., North Hollywood, Calif.

## NEW literature

Write directly to the company for a copy

### Solder Data

A chart shows the melting points in degrees Fahrenheit and centigrade of all available alloys for soldering. Anchor Metal Co. Inc., 966 Meeker Ave., Brooklyn 22, N. Y.

### Freedom from Dust

A 28 page brochure, No. 805, describes dry collection equipment and shows ways of using cloth filtration and cyclonic equipment for eliminating dust control and air pollution problems in industry. Dracco Div., Fuller Co., Harvard Avenue & E. 116th Street, Cleveland 5, Ohio.

### Fusion Welding Aluminum

A 32 page technical handbook covers a number of joining processes, including metal arcwelding and tungsten, inert gas welding. Dept. PRD-31, Reynolds Metals Co., Richmond 18, Va.

### Infrared Heating Data

A 20 page bulletin gives information on infrared heating, its principles, advantages, applications, and typical standard systems. Dept. 49, Infrared Div., Fostoria Corp., Fostoria, Ohio.

### Industrial TV Data

A 112 page catalog covers closed circuit television equipment for industry. Cameras, housings, lenses, monitors, switchers, microwave equipment and television tape recordings are discussed. ITV Dept., Radio Corp. of America, Bldg. 15-1, Camden 2, N. J.

### Welding Electrode Manual

In addition to a handy application diagram, a manual covers Hobart's line of welding electrodes, gas welding rods, nonconsumable electrodes, submerged arcwelding flux, and automatic welding wire. Hobart Bros. Co., Troy, Ohio.

### Diffusion Furnace Bulletin

Bulletin 1081 describes a line of gaseous and solid diffusion furnaces for transistors and semiconductor devices. Pilot Plant Equipment Div., Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill.

### Spring Materials Manual

An 8 page handbook contains comparison tables and discusses various spring properties of several groups of metal alloys. Publications Dept., Riverside-Alloy Metal Div., H. K. Porter Company Inc., Riverside, N. J.

### Precision Spindle Data

Bulletin S-18, 36 pages, describes over 60 different types of precision spindles for grinding, boring, milling, slotting, and drilling, including the high frequency spindles and Anocut spindles arranged for electrolytic grinding. Pope Machinery Corp., 261 River St., Haverhill, Mass.

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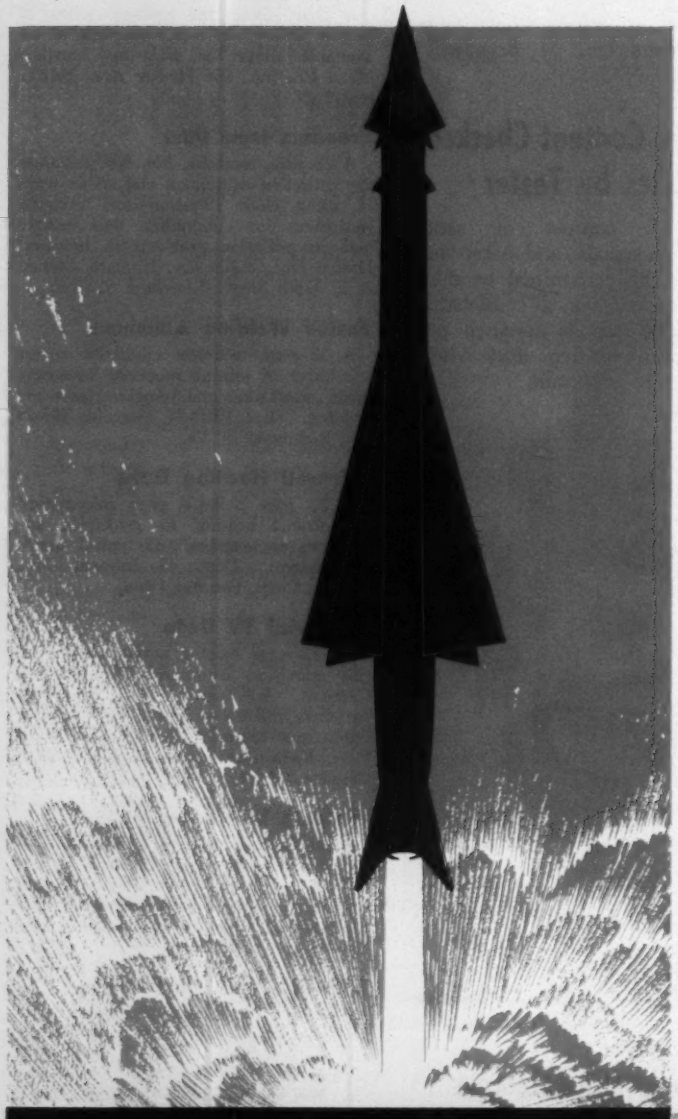

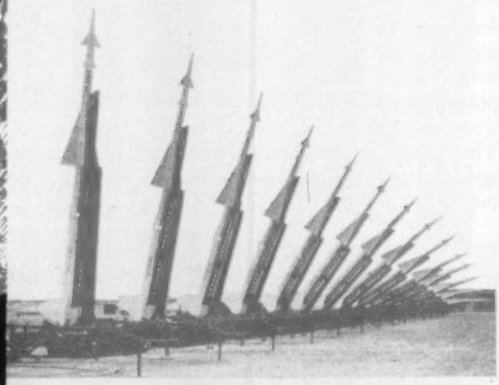

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# Ingot Rate Adjusts to Lower Needs

LOOK for steelmaking operations to average 82 per cent of capacity during the second quarter—12 points under the average in the first three months.

Second quarter output will be about 30.3 million ingot tons (vs. 34.7 million in the quarter just ended). First half production—65 million ingot tons—will be the largest in the steel industry's history, topping the first half, 1959, output by almost 1 million.

**GRADUAL DECLINE—** In the next 13 weeks, you can expect a slow but steady decline in the ingot rate. The week-to-week drop will be about 1 point, if steelmakers don't suddenly decide to close some of their facilities. By late June, operations will hit a low of about 75 per cent.

**INTO THE EIGHTIES—** Last week, the ingot rate dropped below 90 per cent for the first time this year. Steelmakers operated their furnaces at 89.6 per cent of capacity, 1.9 points below the previous week's revised rate. Output was about 2,554,000 ingot tons. In the quarter just ended, both production (34.7 million ingot tons) and finished steel shipments (25 million tons) set all-time records.

**CONSUMPTION TO RISE—** Even though automakers will assemble fewer cars in the second quarter than they did in the first (1.6 million vs. 1.9 million), total steel consumption by all industries will be higher. There will be seasonal upturns in construction, canning, oil country drilling, and railroad trackwork. Steelmakers will ship about 22 million tons of finished products during the second quarter. Their customers will consume 21 million tons—about 1 million more than they chewed up in the first quarter.

**BALANCED INVENTORIES—** Since they can get quick deliveries from the mills and don't have to worry about a midyear strike, steel users are keeping a close check on their inventories. Some have started to liquidate—not by canceling tonnage, but by having shipments deferred. To date, the setbacks haven't hurt mill operations because most steelmakers were overbooked. Had there been no deferments, many mills would have had carryovers from March—particularly in flat rolled products. It would have been impossible for them to ship all their orders on schedule. When steelmakers get cancellations or setbacks, they often find that smaller customers who haven't had a chance to rebuild their stocks are glad to take surplus tonnage. Many in the so-called miscellaneous group expect excellent second quarter business.

**OPENINGS FOR APRIL—** Because of hand-to-mouth buying, most mills can promise April or early May delivery of a broad variety of products: Hot rolled bars, universal and sheared plates, standard structurals, wide flange beams, continuous weld pipe, oil country goods, hot rolled sheets, merchant and manufacturers' wire. Still in relatively tight supply are galvanized and cold rolled sheets, tin plate, and small seamless tubing.

**UTILITIES DISAPPOINT—** In spite of forecasts that U. S. electric power requirements will triple in ten years (from 150 million kw to 479 million kw), utilities are dragging their feet on expansion. Manufacturers of water wheel and steam generators are getting much less business than they expected. Result: Plate producers have had a rash of cancellations and deferments.

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*Current prices were published in the Mar. 21 issue and will appear in subsequent issues.

# "Timely deliveries from U.S. Steel Supply help keep us on schedule," *says Mr. Tom Meyer,*

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*Manufacturers of quality snow plows and angle-dozers for jeeps, trucks, tractors, etc.*

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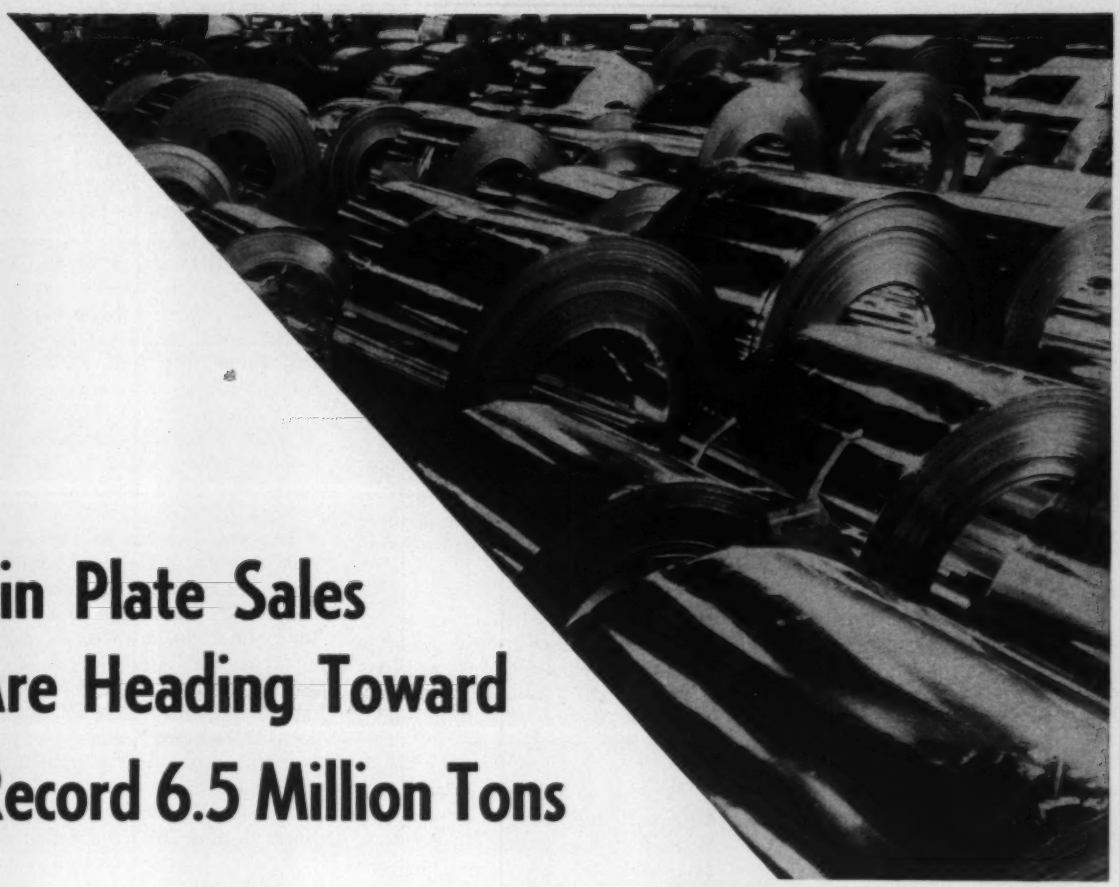

# Tin Plate Sales Are Heading Toward Record 6.5 Million Tons

RECORD SHIPMENTS, product improvement, and the exploitation of new markets promise to make 1960 one of the most eventful years in tin plate history.

Prediction: Shipments of tin mill products by the industry will set a new record of 6.5 million tons, say leading producers. The record stands now at 6.4 million (it was set in 1955). Shipments last year: 5.8 million.

Electrolytic tin plate will make the biggest advance. Shipments will soar from last year's 4.8 million tons to an estimated 5.5 million. Look for black plate shipments of about 610,000 tons (vs. 562,147 last year) and hot dip tin plate shipments of 380,000 tons (vs. 412,123 in 1959).

• **Big Year for Canmaking**—The key factor in the tin plate story will, of course, be can manufacturing. Canmakers take about 80 per cent of the tin mill tonnage shipped annually. Last year, they produced more cans than ever before, about 45 billion. This year, their output should be even greater. Gen. Lucius D. Clay, chairman of Continental Can Co., forecasts a 5 per cent sales increase for his firm.

On the face of it, a 5 per cent increase in can production by all manufacturers wouldn't justify the prediction that tin plate shipments will jump 12 per cent, but there's more to the story. Because of last year's 116 day steel strike, mill and customer tin plate inventories are far below normal. The strike started immediately after the mills had emptied their pipelines and continued through the months when stocks would normally have been rebuilt. When the walkout ended, canmakers had little steel in their warehouses and their suppliers had almost nothing ready for shipment. Although inventories of some can manufacturers are approaching normal, more rebuilding must be done.

• **Thinner Tin Coming** — The big news ahead: Volume production of a lighter, thinner, and stronger tin plate. On Jan. 18, Roger M. Blough, chairman of U. S. Steel Corp., told the National Canners Convention: "I need not point out the economic advantages of such a product to you, nor the competitive advantages of such a product to us."

Since Mr. Blough's announcement, no additional comment has been forthcoming from U. S. Steel and little from other tin plate producers who are known to be rolling thin gages.

It has been reported that "thinner tin plate will be going on the market in commercial quantities in late 1960 or in early 1961." What are the facts?

Here's what a top official of one of the can companies told STEEL: "When you talk about availability, you start by defining 'thin.' If you mean plate weighing 55, 60, or 65 lb per base box, that's commercially available now. But the price isn't attractive. The mills say they can't

produce it without incurring substantial additional costs. They don't quote below 55 lb. We're talking about material that is lighter than that."

• **Needed: Better Physicals**—"We've been encouraging all of the tin plate suppliers for a couple years to make thinner gages and stronger material," the canmaker continues. "The product is still in the developmental stage. We have used several small batches, but the physical properties aren't good enough yet. We get cracks in the side seams and flanges.

"We would like to see the tin plate producers design, engineer, and build equipment expressly for thinner gages. Most of the equipment now in service produces 75 to 135 lb plate. It won't make thinner gages efficiently. New mills should be designed for the 40 to 90 lb range. That will take time, and that's why we think this new product may be two or three years away."

• **Two Approaches**—"There are two approaches to making thinner tin plate," the can executive explains. "One way is to roll to a lighter gage before plating, as Youngstown Sheet & Tube Co. apparently hopes to do with its new, six stand, cold mill at Indiana Harbor (estimated start-up: First quarter, 1961). The other method is to put your material through all of the regular operations and then, as a final step, reduce the plated sheet to a thinner gage. That's what U. S. Steel is doing, with the emphasis on 45, 50, and 60 lb material (0.0051 to 0.0066 in. thick)."

• **Why It's Wanted**—"The lightest plate we're using in volume is 75 lb material (0.0083 in. thick)," the canmaker continues. "If we could use 50 lb plate instead of 75 lb, we would get more square feet per ton (it's sold on an area basis) and we could cut our freight costs by a third. There's just one difficulty: Our manufacturing costs are greater on 50 lb plate than on 70 or 75 lb. We don't know whether we'll be able to run the thinner gages at such high speeds. We'll have to use coils 34 to 37 in. wide—production would be too small otherwise—and we'll have to keep the stuff flat so that we can lithograph it. We hope we can save enough on material and freight costs to more than offset our higher manufacturing expenses."

**Tin Mill Shipments[1] Climbing to All-time Peak**

(Millions of tons)

| | |
|---|---|
| 1960 | 6.5 |
| 1959 | 5.8 |
| 1958 | 6.1 |
| 1957 | 5.9 |
| 1956 | 6.3 |

[1]Includes electrolytic and hot dip tin plate and black plate.

• **New Markets**—This year, steelmakers are going all out to promote the sale of soft drinks in cans. First marketed in 1954, they've had their ups and downs, but last year's growth was encouraging.

• **Signs of a Breakthrough**—Pepsi-Cola will start using cans this year. Seven-Up, which introduced them last June, will expand their use and build a canning line at Salisbury, Md. Coca-Cola will continue its test marketing. This summer, U. S. Steel Corp. will promote canned soft drinks as never before—with business publications, consumer magazines, network television, billboards, and local newspapers.

Still in the developmental stage but promising is the canning of milk concentrates. After more than five years of research, sponsored primarily by U. S. Steel and conducted at the University of Wisconsin, a marketable concentrate has been developed. Different from condensed milk, it has the flavor and consistency of whole milk after being reconstituted with water. It will keep for months.

• **Rising Capacity**—By the end of the year, American steelmakers will have 48 electrolytic tinning lines with an annual capacity of 7 million tons, Wean Engineering Co. Inc., Warren, Ohio, estimates. Four lines are under construction—they were delayed somewhat by last year's steel strike. They're at Inland Steel Co., Granite City Steel Co., Midwest Steel Corp. (a division of National Steel Corp.), and U. S. Steel Corp. (Fairless Works).

Foreign steelmakers have 24 lines, with an estimated annual capacity of 3 million tons. There are six in Great Britain (five in Wales, one in England), five in Japan, four in Canada, three in France, and one each in Belgium, Holland, Italy, Mexico, Brazil, and Argentina. Next year, three will be added: 1. A horizontal acid line for Broken Hill Proprietary Ltd., Australia. 2. An additional Ferrostan line for Steel Co. of Wales Ltd. (Trostre Works). 3. An additional Ferrostan line for Richard Thomas & Baldwins Ltd., Great Britain.

• **Imports, Exports to Drop**—Last year, largely because of the steel strike, tin mill product imports shot up to 67,113 tons (vs. 182 tons in 1958 and 1145 in 1956, the biggest prior year). Although there was probably more to the pickup than the scarcity of American steel—in part, it reflected users' interest in shopping for other suppliers and checking the quality of foreign material—market analysts expect a sharp decline in imports this year.

Exports of tin mill products dropped again last year, continuing a downtrend that started in 1955. Last year's exports were 272,819 tons (vs. 351,972 in 1958 and 773,287 in 1955). Look for the decline to continue as foreign steelmakers expand their capacity to meet demand in their own countries and compete more aggressively for business in other lands.

## Sheets, Strip . . .

Sheet & Strip Prices, Pages 123 & 124

Additional space is opening in May and June sheet rolling schedules, both hot and cold rolled. Also, there are openings appearing in June galvanized sheet rolling schedules. Despite the apparent easing, the sheetmakers think they will be able to book sufficient business to keep the cold rolled and galvanized mills operating at a high rate throughout the second quarter.

Demand for cold rolled sheets exceeds that for hot rolled, with little tonnage available before mid-May. Hot sheets can be picked up for delivery in late April and early May. Enameling stock and electrical

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Left panel, plated with 0.01 mil ordinary chromium gets ASTM rating of 0.

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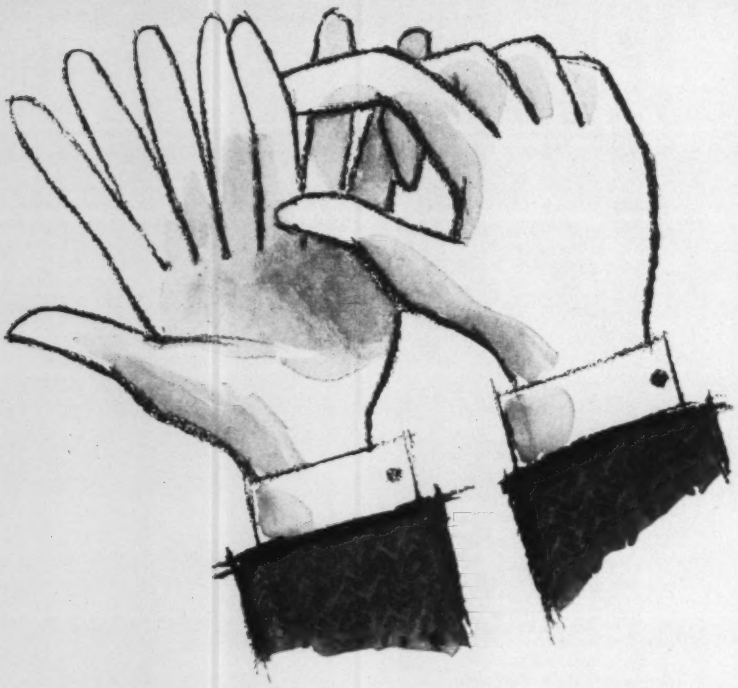

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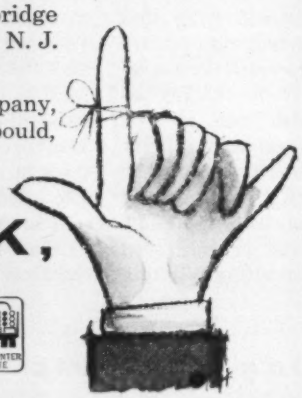

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## Eastern Steel Importers Hit by Slackened Demand

Eastern steel importers report slow business, and they look for a further dip before there is any improvement.

Domestic consumers have improved their inventories and anticipate few shortages in any product. They no longer are concerned even about galvanized sheets, the product in most stringent supply. There is relatively little buying pressure for foreign origin cold rolled sheets, and importers have virtually withdrawn from the market (normally cold rolled sheets are not an import item).

Currently, prices on imported steel from western continental Europe are unchanged, except for galvanized sheets in coils, which are off $4 a ton, and nails, which are down $3.

European deliveries on shapes, bars, and wire run around two months; plates around two and a half months.

## Stainless Steel . . .

Stainless Steel Prices, Page 126

Producers of stainless steel hold large order backlogs, but they're concerned about future operations. New orders are coming in slowly. During the strike, consumers may have booked tonnage with nonstruck producers far ahead, believe some of the larger companies.

Automakers have indicated they won't place additional orders until they have brought their inventories into balance with revised production schedules.

## Steel Bars . . .

Bar Prices, Page 122

Business in hot rolled carbon bars continues to lag, but order cutbacks have declined. Most buyers are well stocked and are buying only for current consumption. Some large bar producers can still book tonnage for April shipment, depending on size and grade.

There is less pressure for shipments from fastener manufacturers and cold finishers. Cold finishers report less pressure for deliveries from their customers. The ware-

houses are ordering less tonnage. Forge shops are generally operating off inventories. Screw machine consumption is well maintained.

Cold finished bar producers say users are living hand-to-mouth; they are trying to get by on minimum inventories, waiting until the last minute to place new orders.

## Reinforcing Bars . . .

**Reinforcing Bar Prices, Page 123**

Buyers of reinforcing steel are well stocked, and until building conditions become more favorable, it's unlikely they'll put much pressure on the mills for deliveries. Another month or so, though, should make considerable difference in demand.

With contractors quoting 12.00 to 13.00 cents per pound, fabricated and in place, reinforcing bar prices are not firming up, even for long term requirements.

Truscon Steel Div., Republic Steel Corp., closed down its Youngstown plant last week, idling about 500 employees.

## Tubular Goods . . .

**Tubular Goods Prices, Page 126**

Order backlogs in the popular sizes of oil country tubing are shrinking rapidly, but producers are behind schedule on some deliveries. Drill pipe demand has improved slightly. Tubemakers are hoping business will pick up when the weather improves.

Rotary oil drilling operations are still plagued by bad weather. In the week ended Mar. 14, 1651 rigs were operating, off four from the preceding week, reports Hughes Tool Co.

March orders for standard pipe were a far cry from February's total. Buttweld pipe seems to be holding up better than other standard items.

## Structural Shapes . . .

**Structural Shape Prices, Page 122**

While inquiry is running ahead of awards, more structural steel contracts are noted as building construction begins to show appreciable improvement. The uptrend is expected to pick up momentum as spring advances. At the moment, public work is leading, but there's growing inquiry for industrial and commercial construction which




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should be reflected in awards over the next several weeks.

So far, there has been no noticeable tightening in supplies of structural steel. Standard shapes are still available within four to five weeks, and wide flange sections in six to seven weeks.

## Japanese Steel Competing In the Alaskan Market

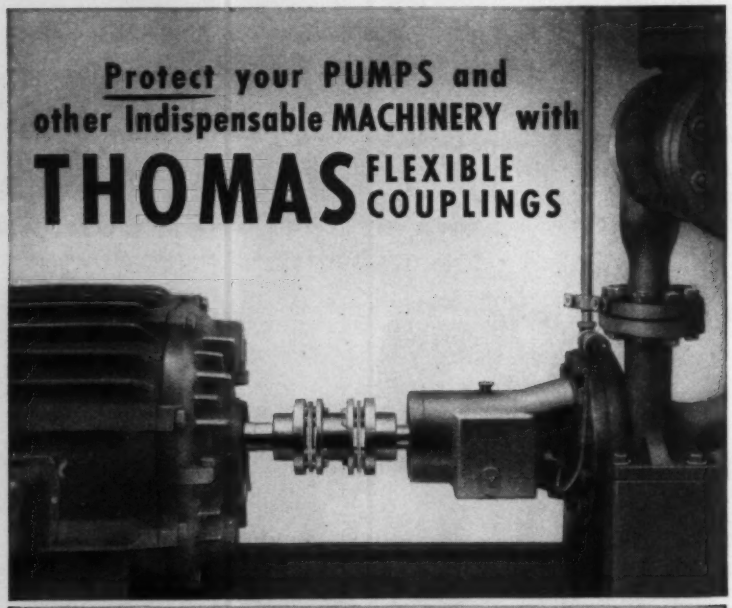
Japanese steel threatens to provide formidable competition to American steel in the Alaskan market. The first large direct shipment of Japanese steel to that state (3800 tons of reinforcing bars, pipe, galvanized sheets, and nails) will be unloaded at Anchorage in May from the Japanese steamer, *Kobe Maru*.

The importer, Palmer C. Lewis Co,. Seattle, deals largely in building supplies. The firm has established connections with Japanese steelmakers and expects to continue to bring in steel. The company has warehouse and terminal facilities in Anchorage.

It's estimated that laid-down costs in Alaska favor Japanese imports by 10 to 15 per cent on the average, although on small shipments the differential may be higher. Domestic steel is handicapped by the high water freights which add from 25 to 40 per cent to the price of steel at Pacific Coast ports.

In addition, Japanese freighters are calling more frequently in Alaska for return cargoes of scrap, pulp, and paper from a recently opened plant in Sitka in which Japanese capital is invested.

Later in May, 1500 tons of Japanese steel pipe, 4¼ to 13 in. in diameter, will be discharged at Anchorage for use in transporting natural gas from Union Oil Co. wells on the Kenai peninsula.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- Original Balance for Life
- No Lubrication
- No Wearing Parts
- No Maintenance

*Write for Engineering Catalog 51A*

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.


## Distributors . . .

Prices, Page 127

Some service center operators doubt they will do better business this month on a day to day basis than they did in February. However, the showing for the month as a whole should be better, largely because of the greater number of working days. Actually, March may be the best volume month so far this year, even though some distributors are disappointed with their over-all order total.

Except for cold rolled and galvanized sheets, there is little pressure for any product. The service centers' demands on the mills, as a result, are fairly limited. Generally, warehouse stocks are fast getting back into balance.

Prices appear to be fairly firm, but some shading is reported at coastal points where severe competition from imported steel products is encountered.

## Plates . . .

Plate Prices, Page 122

Platemakers' bookings are still declining. Shipyards, fabricators of large storage tanks and line pipe, and the service centers are all specifying smaller tonnage. One eastern fabricated pipe mill has suspended operations due to lack of business. Demand for heavy industrial equipment and railroad rolling stock is also easing.

In general, however, the outlook is still considered promising. Charles L. Huston Jr., president, Lukens Steel Co., Coatesville, Pa., predicts

1960 sales will approximate the company's all-time high of $130 million in 1957. Sales for the first 12 weeks of this year will total about $30 million.

With a buyers' market developing, most grades of plates, alloy, carbon, and stainless can be shipped through May. Some sheared plate is available for April rolling. June bookings are confined largely to fill-in orders and new construction contracts.

The Navy is placing about 10,000 tons of plates for the second quarter, including floor plates and stainless. The total is slightly under its first quarter tonnage.

A large contract requiring plate specialties involves full-track combat tanks placed with the Chrysler Corp., Detroit, by Army Ordnance. They'll cost $12 million.

## Wire . . .

Wire Prices, Pages 124 & 125

Despite seasonal influences, domestic producers of merchant wire and nails report little improvement in bookings. They can easily make shipments in two to three weeks. Restricted business is due in part to foreign competition.

Demand for manufacturers wire is slower; one maker reports business is less active than it has been in the last six or eight months. The setback is due mainly to slackening automotive requirements, and agricultural implement makers have not been ordering actively. They are seeking to hold down their inventories.

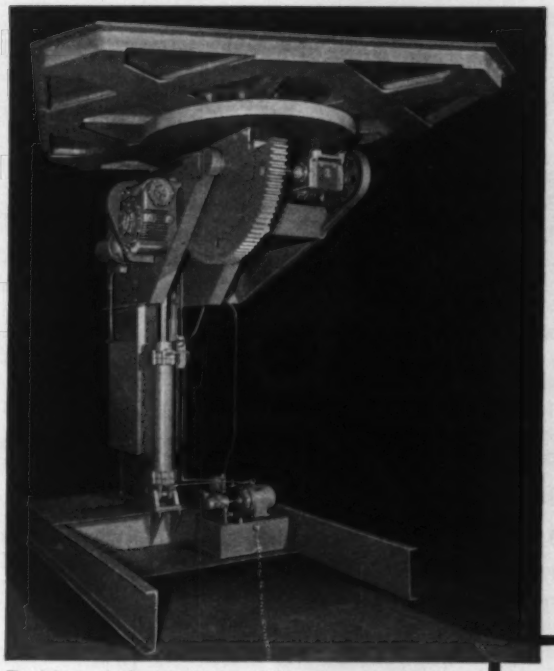
Deliveries on manufacturers wire now range around four weeks. One mill that reported February order volume among the largest in its history is now eating into its backlog.

## Refractories . . .

Refractories Prices, Page 128

Plans for construction of a basic brick plant at Womelsdorf, Pa., were announced last week by E. W. Valensi, president, North American Refractories Co., Cleveland. The plant, scheduled for completion late this year, will produce basic brick and specialty products for the steel and other industries.

Plans have also been completed for construction of a manufacturing unit at a location to be announced. It will produce tar bond-

Put 20 tons where you want it

Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

NEW: "Big" drilling jobs made easy

This custom "radial drill" is provided by combining standard Delta drill press components—a ball bearing traveling carriage, column, raising mechanism and choice of four Delta 20" drill heads. Mounted on an overhead track, it handles jobs too big for conventional drilling—in production runs too small to justify expensive, special tooling.

Another example of how rugged, versatile, and highly accurate Delta Industrial Tools are being used to replace costly conventional tooling. For illustrated booklet of cost-cutting ideas, write: Rockwell Manufacturing Company, Delta Power Tool Division, 6 3 8 C N. Lexington Ave., Pittsburgh 8, Pa. In Canada, Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.

ed brick used to line steelmaking oxygen converters.

It's anticipated that both plants will be in operation by the end of this year. Addition of the two facilities will bring to nine the number of plants operated by the company in Pennsylvania, Ohio, Kentucky, and Missouri.

## Tin Plate . . .

Tin Plate Prices, Page 124

Demand for tin plate is expected to hold up well into the third quarter, or until canmakers have produced enough cans to accommodate the summer food pack.

## Prices on Imported Steel Weaken in the Southwest

Liquidation of excess foreign steel stocks continues in the Houston area. Prices are fluid; many speculators are anxious to sell out. Stocked material is moving below the futures price.

A slowdown in new orders for foreign steel is apparent. Consumer inventories are in good shape, and brokers are hesitant about placing significant tonnage for delivery three to four months distant when there is a strong belief overseas mills will slash their prices drastically by midyear.

Observers think the volume of imports will decline sharply during May and June. January's total through Galveston-Houston ports was 73,000 tons. In February the total was 43,000.

One French mill issued a new price list to Houston customers last week showing sharp reductions on rounds and squares, flat bars, angles, structural channels, and I-beams.

## Rails, Cars . . .

Track Material Prices, Page 125

Domestic freight car orders declined in February to 3411 units vs. 7149 in January, reports the American Railway Car Institute and the Association of American Railroads. In February, 1959, 1803 cars were placed.

Deliveries of freight cars amounted to 5052 in February vs. 2849 in January and 2486 in February a year ago.

Order backlogs as of Mar. 1 numbered 23,607 cars in railroad shops and 22,716 in commercial shops, for a total of 46,323. That compares with 48,170 on Feb. 1, and 28,789 on Mar. 1, 1959.

## Pig Iron . . .

Pig Iron Prices, Page 127

Inventory reduction at some foundries is going to hold March shipments of merchant pig iron to a total somewhat below that in February. But coke shipments to the foundries will be heavier. Because of its bulk, coke is awkward to stock, so, currently, shipments provide a better gage of foundry activity than pig iron.

Pig iron inventories grew substantially early this year as the foundries took deliveries ordered under contracts placed late in 1959, when supplies were jeopardized by the steel strike. Now the casting shops are well supplied, and there has been some slackening in operations. One large shop in the East, for example, is suspending operations due to a cutback in automotive work. A soil pipe producer has closed down for two weeks due to lack of business. Pressure pipe interests are specifying lightly, while some jobbing shops are having difficulty maintaining four-day-per-week production schedules.

New England gray iron and malleable foundries are melting at somewhat higher rates—70 to 80 per cent of capacity. Several larger consumers, textile equipment shops, are near the higher operating estimate. Most area foundries are buying pig iron hand to mouth.

Freight between Springfield and Hopedale, Mass., has been reduced to $4.58 a gross ton from $6.63.

More blast furnaces are being idled. U. S. Steel Corp. has closed down its No. 2 stack at the National Tube Div.'s National Works, McKeesport, Pa., due to a decline in demand for hot metal. This leaves three out of four stacks operating at the works.

Youngstown Sheet & Tube Co. is taking off its Grace blast furnace at its Brier Hill (Youngstown) Works, where it suspended operation of two open hearths last week. This leaves 19 of 24 furnaces in operation in the Valley. Idling of the stack reflects reduced pressure for open hearth production and the current low prices on scrap in the area.

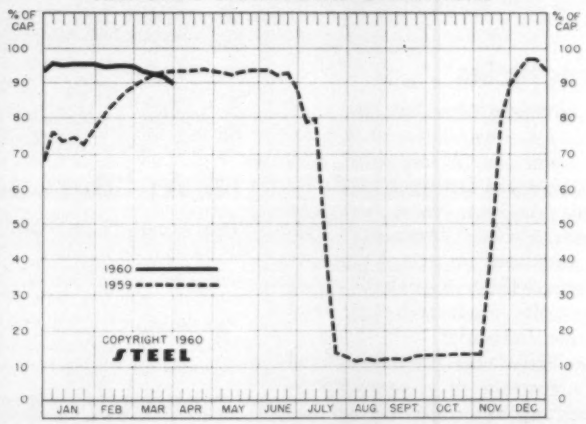
### DISTRICT INGOT RATES

(Percentage of capacity utilized)

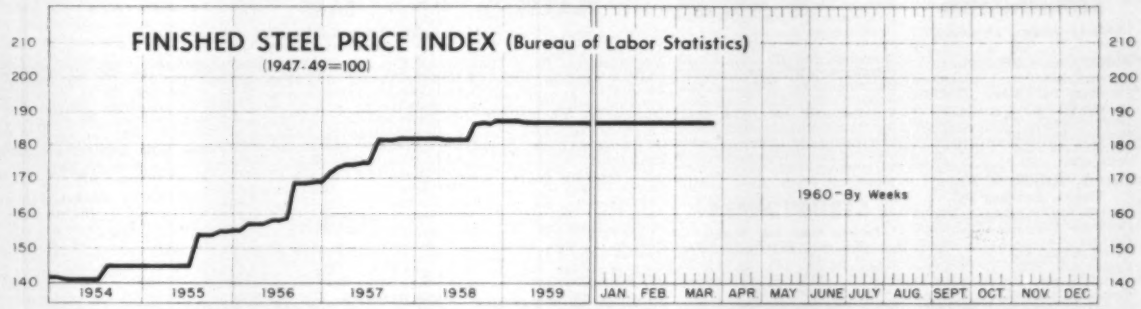
| | Week Ended Mar. 27 | Week Ago | Month Ago | Year Ago |
|---|---|---|---|---|
| Northeastern | 86 | 87 | 92 | 98 |
| Buffalo | 98 | 103 | 100 | 99 |
| Pittsburgh | 90 | 94 | 96 | 97 |
| Youngstown | 79 | 86 | 89 | 87 |
| Cleveland | 102 | 100 | 102 | 96 |
| Detroit | 99 | 100 | 102 | 96 |
| Chicago | 95 | 96 | 98 | 92 |
| Cincinnati | 100 | 98 | 101 | 86 |
| St. Louis | 99 | 86 | 103 | 101 |
| Southern | 85 | 87 | 88 | 94 |
| Western | 78 | 80 | 90 | 87 |
| Total Industry | 89.6 | 91.5 | 94.4 | 92.9 |
| Index (1947-49=100) | 159.0 | 162.3 | 167.5 | 163.8 |
| Net Tons (In thousands) | 2,554 | 2,607 | 2,690 | 2,631 |

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

### NATIONAL STEELWORKS OPERATIONS



# Price Indexes and Composites




| Mar. 22, 1960 | Week Ago | Month Ago | Feb. Index | Year Ago |
|---|---|---|---|---|
| 186.8 | 186.8 | 186.8 | 186.8 | 186.7 |

## AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Mar. 22

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

| | | | |
|---|---|---|---|
| Rails, Standard No. 1 | $5.825 | Bars, Reinforcing | 6.385 |
| Rails, Light, 40 lb | 7.292 | Bars, C.F., Carbon | 10.710 |
| Tie Plates | 6.875 | Bars, C.F., Alloy | 14.125 |
| Axles, Railway | 10.175 | Bars, C.F., Stainless, 302 (lb) | 0.570 |
| Wheels, Freight Car, 33 in. (per wheel) | 62.000 | Sheets, H.R., Carbon | 6.350 |
| Plates, Carbon | 6.350 | Sheets, C.R., Carbon | 7.300 |
| Structural Shapes | 6.167 | Sheets, Galvanized | 8.765 |
| Bars, Tool Steel, Carbon (lb) | 0.560 | Sheets, C.R., Stainless, 302 (lb) | 0.658 |
| Bars, Tool Steel, Alloy, Oil Hardening Die (lb) | 0.680 | Sheets, Electrical | 12.625 |
| Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb) | 1.400 | Strip, C.R., Carbon | 9.489 |
| Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb) | 1.895 | Strip, C.R., Stainless, 430 (lb) | 0.480 |
| Bars, H.R., Alloy | 10.775 | Strip, H.R., Carbon | 6.250 |
| Bars, H.R., Stainless, 303 (lb) | 0.543 | Pipe, Black, Buttweld (100 ft) | 19.905 |
| Bars, H.R., Carbon | 6.675 | Pipe, Galv., Buttweld (100 ft) | 23.585 |
| | | Pipe, Line (100 ft) | 199.533 |
| | | Casing, Oil Well, Carbon (100 ft) | 201.080 |
| | | Casing, Oil Well, Alloy (100 ft) | 315.213 |
| | | Tubes, Boiler (100 ft) | 51.200 |
| | | Tubing, Mechanical, Carbon (100 ft) | 27.005 |
| | | Tubing, Mechanical, Stainless, 304 (100 ft) | 205.608 |
| | | Tin Plate, Hot-dipped, 1.25 lb (95 lb base box) | 10.100 |
| | | Tin Plate, Electrolytic, 0.25 lb (95 lb base box) | 8.800 |
| | | Black Plate, Canmaking Quality (95 lb base box) | 7.900 |
| | | Wire, Drawn, Carbon | 10.575 |
| | | Wire, Drawn, Stainless, 430 (lb) | 0.665 |
| | | Bale Ties (bundles) | 7.967 |
| | | Nails, Wire, 8d Common | 9.825 |
| | | Wire, Barbed (80-rod spool) | 8.746 |
| | | Woven Wire Fence (20-rod roll) | 21.880 |

## STEEL's FINISHED PRICE INDEX*

| | Mar. 23 1960 | Week Ago | Month Ago | Year Ago | 5 Yr Ago |
|---|---|---|---|---|---|
| Index (1935-39 avg=100) | 247.82 | 247.82 | 247.82 | 247.82 | 194.83 |
| Index in cents per lb | 6.713 | 6.713 | 6.713 | 6.713 | 5.270 |

## STEEL's ARITHMETICAL PRICE COMPOSITES*

| | | | | | |
|---|---|---|---|---|---|
| Finished Steel, NT | $149.96 | $149.96 | $149.96 | $149.96 | $118.23 |
| No. 2 Fdry, Pig Iron, GT | 66.49 | 66.49 | 66.49 | 66.49 | 56.54 |
| Basic Pig Iron, GT | 65.99 | 65.99 | 65.99 | 65.99 | 56.04 |
| Malleable Pig Iron, GT | 67.27 | 67.27 | 67.27 | 67.27 | 57.27 |
| Steelmaking Scrap, GT | 34.00 | 34.00 | 36.17 | 39.33 | 37.75 |

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

# Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

| FINISHED STEEL | Mar. 23 1960 | Week Ago | Month Ago | Year Ago | 5 Yr Ago |
|---|---|---|---|---|---|
| Bars, H.R., Pittsburgh | 5.675 | 5.675 | 5.675 | 5.675 | 4.30 |
| Bars, H.R., Chicago | 5.675 | 5.675 | 5.675 | 5.675 | 4.30 |
| Bars, H.R., deld., Philadelphia | 5.975 | 5.975 | 5.975 | 5.975 | 4.55 |
| Bars, C.R., Pittsburgh | 7.65* | 7.65* | 7.65* | 7.65* | 5.40 |
| Shapes, Std., Pittsburgh | 5.50 | 5.50 | 5.50 | 5.50 | 4.25 |
| Shapes, Std., Chicago | 5.50 | 5.50 | 5.50 | 5.50 | 4.26 |
| Shapes, deld., Philadelphia | 5.77 | 5.77 | 5.77 | 5.77 | 4.53 |
| Plates, Pittsburgh | 5.30 | 5.30 | 5.30 | 5.30 | 4.225 |
| Plates, Chicago | 5.30 | 5.30 | 5.30 | 5.30 | 4.225 |
| Plates, Coatesville, Pa. | 5.30 | 5.30 | 5.30 | 5.30 | 4.226 |
| Plates, Sparrows Point, Md. | 5.30 | 5.30 | 5.30 | 5.30 | 4.225 |
| Plates, Claymont, Del. | 5.30 | 5.30 | 5.30 | 5.30 | 4.225 |
| Sheets, H.R., Pittsburgh | 5.10 | 5.10 | 5.10 | 5.10 | 4.05 |
| Sheets, H.R., Chicago | 5.10 | 5.10 | 5.10 | 5.10 | 4.05 |
| Sheets, C.R., Pittsburgh | 6.275 | 6.275 | 6.275 | 6.275 | 4.95 |
| Sheets, C.R., Chicago | 6.275 | 6.275 | 6.275 | 6.275 | 4.95 |
| Sheets, C.R., Detroit | 6.275 | 6.275 | 6.275 | 6.275 | 5.10 |
| Sheets, Galv., Pittsburgh | 6.875 | 6.875 | 6.875 | 6.875 | 5.45 |
| Strip, H.R., Pittsburgh | 5.10 | 5.10 | 5.10 | 5.10 | 4.05 |
| Strip, H.R., Chicago | 5.10 | 5.10 | 5.10 | 5.10 | 4.05 |
| Strip, C.R., Pittsburgh | 7.425 | 7.425 | 7.425 | 7.425 | 5.75 |
| Strip, C.R., Chicago | 7.425 | 7.425 | 7.425 | 7.425 | 5.85 |
| Strip, C.R., Detroit | 7.425 | 7.425 | 7.425 | 7.425 | 5.90 |
| Wire, Basic, Pittsburgh | 8.00 | 8.00 | 8.00 | 8.00 | 5.75 |
| Nails, Wire, Pittsburgh | 8.95 | 8.95 | 8.95 | 8.95 | 6.85 |
| Tin plate (1.50 lb) box, Pitts. | $10.65 | $10.65 | $10.65 | $10.65 | $9.05 |

*Including 0.35c for special quality.

| SEMIFINISHED STEEL | | | | | |
|---|---|---|---|---|---|
| Billets, forging, Pitts. (NT) | $99.50 | $99.50 | $99.50 | $99.50 | $78.00 |
| Wire rods, 7/32-9/16" Pitts. | 6.40 | 6.40 | 6.40 | 6.40 | 4.675 |

| PIG IRON, Gross Ton | Mar. 23 1960 | Week Ago | Month Ago | Year Ago | 5 Yr Ago |
|---|---|---|---|---|---|
| Bessemer, Pittsburgh | $67.00 | $67.00 | $67.00 | $67.00 | $57.00 |
| Basic, Valley | 66.00 | 66.00 | 66.00 | 66.00 | 56.00 |
| Basic, deld., Philadelphia | 70.41 | 70.41 | 70.41 | 70.41 | 59.66 |
| No. 2 Fdry, Neville Island, Pa. | 66.50 | 66.50 | 66.50 | 66.50 | 56.50 |
| No. 2 Fdry, Chicago | 66.50 | 66.50 | 66.50 | 66.50 | 56.50 |
| No. 2 Fdry, deld., Phila. | 70.91 | 70.91 | 70.91 | 70.91 | 55.16 |
| No. 2 Fdry, Birmingham | 62.50 | 62.50 | 62.50 | 62.50 | 52.38 |
| No. 2 Fdry (Birm.), deld., Cin. | 70.20 | 70.20 | 70.20 | 70.20 | 60.58 |
| Malleable, Valley | 66.50 | 66.50 | 66.50 | 66.50 | 56.50 |
| Malleable, Chicago | 66.50 | 66.50 | 66.50 | 66.50 | 56.50 |
| Ferromanganese, net tonst. | 245.00 | 245.00 | 245.00 | 245.00 | 190.00 |

†74-76% Mn, Duquesne, Pa.

| SCRAP, Gross Ton (Including broker's commission) | | | | | |
|---|---|---|---|---|---|
| No. 1 Heavy Melt, Pittsburgh | $34.50 | $34.50 | $36.50 | $38.50 | $38.50 |
| No. 1 Heavy Melt, E. Pa. | 36.00 | 36.00 | 38.00 | 38.00 | 38.75 |
| No. 1 Heavy Melt, Chicago | 31.50 | 31.50 | 34.00 | 41.50 | 36.00 |
| No. 1 Heavy Melt, Valley | 36.50 | 36.50 | 39.50 | 43.50 | 37.50 |
| No. 1 Heavy Melt, Cleve. | 33.50 | 33.50 | 36.50 | 39.50 | 35.00 |
| No. 1 Heavy Melt, Buffalo | 31.50 | 31.50 | 36.50 | 39.50 | 32.50 |
| Rails, Rerolling, Chicago | 53.50 | 53.50 | 59.50 | 62.50 | 50.50 |
| No. 1 Cast, Chicago | 45.50 | 45.50 | 47.50 | 48.50 | 40.00 |

| COKE, Net Ton | | | | | |
|---|---|---|---|---|---|
| Beehive, Furn., Connlsvl. | $15.00 | $15.00 | $15.00 | $15.00 | $13.75 |
| Beehive, Fdry., Connlsvl. | 18.25 | 18.25 | 18.25 | 18.25 | 16.75 |
| Oven, Fdry., Milwaukee | 32.00 | 32.00 | 32.00 | 32.00 | 25.25 |

# Steel Prices

Mill prices as reported to STEEL, Mar. 23, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 123; footnotes, page 125.

## SEMIFINISHED

**INGOTS, Carbon, Forging (NT)**
Munhall,Pa. U5 ....$76.00

**INGOTS, Alloy (NT)**
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

**BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)**
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 .80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

**Carbon, Forging (NT)**
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

**Alloy, Forging (NT)**
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville O. S3 ....119.00
Massillon O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

**ROUNDS, SEAMLESS TUBE (NT)**
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ..122.50
Warren,O. C17 ....122.50

**SKELP**
Aliquippa,Pa. J5 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ...5.05

**WIRE RODS**
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

## STRUCTURALS

**Carbon Steel Std. Shapes**
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
Los Angeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

**Wide Flange**
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

**Alloy Std. Shapes**
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

**H.S., L.A., Std. Shapes**
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

**H.S., L.A., Wide Flange**
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

## PILING

**BEARING PILES**
Bethlehem,Pa. B2 ....5.55
Ind.Harbor Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

**STEEL SHEET PILING**
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 ....6.50
S.Chicago Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

## PLATES

**PLATES, Carbon Steel**
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

**PLATES, Carbon Abras. Resist.**
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

**PLATES, Wrought Iron**
Economy,Pa. B14 ....14.10

**PLATES, H.S. L.A.**
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y-1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

**PLATES, Alloy**
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 ....7.50

**FLOOR PLATES**
Cleveland J5 ....6.375
Conshohocken,Pa. A3..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

**PLATES, Ingot Iron**
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10..6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

## BARS

**BARS, Hot-Rolled Carbon (Merchant Quality)**
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa. (9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ....5.675
Birmingham(9) C15 ....5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ....6.425
Fairfield,Ala.(9) T2 ....5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ....6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ....5.675
Joliet,Ill. P2 ....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ....5.675
Seattle A24, B3, N15 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 ..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 ..6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

**BARS, Hot-Rolled Alloy**
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

**BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy**
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

**BAR SIZE ANGLES; H.R. Carbon**
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

**BAR SIZE ANGLES; S. SHAPES**
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

**BAR SIZE ANGLES; S. SHAPES Wrought Iron**
Economy,Pa. B14 ....16.45

**BAR SHAPES, Hot-Rolled Alloy**
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.06
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

**BARS, C.F. Leaded (Including leaded extra) Carbon**
LosAngeles P2, S30 ..11.75*

**Alloy**
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

**BARS, Cold-Finished Carbon**
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles (49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

**BARS, Cold-Finished Carbon (Turned and Ground)**
Cumberland,Md.(5) C19..6.55

**BARS, Cold-Finished Alloy**
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 ....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025
Warren,O. C17 ....9.025

Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

**BARS, Reinforcing, Billet (To Fabricators)**

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 .5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.San Francisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ....6.375
Youngstown R2, U5 ..5.675

**BARS, Reinforcing, Billet (Fabricated: To Consumers)**

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

**BARS, Wrought Iron**

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

**BARS, Rail Steel**

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda (3) B12 ...5.575
Tonawanda(4) B12 ....6.10

## SHEETS

**SHEETS, Hot-Rolled Steel (18 Gage and Heavier)**

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif.C11 .....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ...5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

**SHEETS, H.R. (19 Ga. & Lighter)**

Niles,O. M21, S3 ....6.275

**SHEETS, H.R., Alloy**

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

**SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy**

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

**SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)**

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

**SHEETS, Cold-Rolled Ingot Iron**

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

**SHEETS, Cold-Rolled Steel (Commercial Quality)**

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ...6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ....7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 .....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

**SHEETS, Cold-Rolled, High-Strength, Low-Alloy**

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 .....9.275
Youngstown Y1 .....9.275

| SHEETS, Culvert | Cu Steel | Cu Fe |
|---|---|---|
| Ala.City,Ala. R2 | 7.225 | .... |
| Ashland,Ky. A10 | 7.225 | 7.475 |
| Canton,O. R2 | 7.225 | .... |
| Fairfield,Ala. T2 | 7.225 | 7.475 |
| Gary,Ind. U5 | 7.225 | 7.475 |
| GraniteCity,Ill.G4 | 7.325 | .... |
| Ind.Harbor I-2 | 7.225 | 7.475 |
| Irvin,Pa. U5 | 7.225 | 7.475 |
| Kokomo,Ind. C16 | 7.325 | .... |
| MartinsFry. W10 | 7.225 | 7.475 |
| Pitts.,Calif. C11 | 7.975 | .... |
| Pittsburgh J5 | 7.225 | .... |
| SparrowsPt. B2 | 7.225 | .... |

**SHEETS, Culvert—Pure Iron**

Ind.Harbor,Ind. I-2 ....7.475

**SHEETS, Galvanized Steel Hot-Dipped**

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt., Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

**SHEETS, Galvanized High-Strength, Low-Alloy**

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparowsPt.(39) B2 ..10.025

**SHEETS, Galvannealed Steel**

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

**SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)**

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ...7.125

**SHEETS, Electrogalvanized**

Cleveland(28) R2 .....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

**SHEETS, Well Casing**

Fontana,Calif. K1 ....7.325

**SHEETS, Aluminum Coated**

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

**SHEETS, Enameling**

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

**BLUED STOCK, 29 Gage**

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

**SHEETS, Long Terne, Steel (Commercial Quality)**

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

**SHEETS, Long Terne, Ingot Iron**

Middletown,O. A10 ....7.625

## Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Farro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

## STRIP

**STRIP, Hot-Rolled Carbon**

| | |
|---|---|
| Ala. City, Ala. (27) R2 | 5.10 |
| Allenport, Pa. P7 | 5.10 |
| Alton, Ill. L1 | 5.30 |
| Ashland, Ky. (8) A10 | 5.10 |
| Atlanta A11 | 5.10 |
| Bessemer, Ala. T2 | 5.10 |
| Birmingham C15 | 5.10 |
| Conshohocken, Pa. A3 | 5.15 |
| Detroit M1 | 5.10 |
| Ecorse, Mich. G5 | 5.10 |
| Fairfield, Ala. T2 | 5.10 |
| Farrell, Pa. S3 | 5.10 |
| Fontana, Calif. K1 | 5.825 |
| Gary, Ind. U5 | 5.10 |
| Ind. Harbor, Ind. I-2, Y1 | 5.10 |
| Johnstown, Pa. (25) B2 | 5.10 |
| Lackaw'na, N.Y. (25) B2 | 5.10 |
| Los Angeles (25) B3 | 5.85 |
| Los Angeles C1 | 8.60 |
| Minnequa, Colo. C10 | 6.20 |
| Riverdale, Ill. A1 | 5.10 |
| San Francisco S7 | 6.60 |
| Seattle (25) B3 | 6.10 |
| Seattle N14 | 6.60 |
| Sharon, Pa. S3 | 5.10 |
| S. Chicago, Ill. W14 | 5.10 |
| S. San Francisco (25) B3 | 5.85 |
| Sparrows Point, Md. B2 | 5.10 |
| Torrance, Calif. C11 | 5.85 |
| Warren, O. R2 | 5.10 |
| Weirton, W.Va. W6 | 5.10 |
| Youngstown U5 | 5.10 |

**STRIP, Hot-Rolled Alloy**

| | |
|---|---|
| Carnegie, Pa. S18 | 8.40 |
| Farrell, Pa. S3 | 8.40 |
| Gary, Ind. U5 | 8.40 |
| Houston S5 | 8.65 |
| Ind. Harbor, Ind. Y1 | 8.40 |
| Kansas City, Mo. S5 | 8.65 |
| Los Angeles B3 | 9.60 |
| Lowellville, O. S3 | 8.40 |
| Newport, Ky. A2 | 8.40 |
| Sharon, Pa. A2, S3 | 8.40 |
| S. Chicago, Ill. W14 | 8.40 |
| Youngstown U5, Y1 | 8.40 |

**STRIP, Hot-Rolled High-Strength, Low-Alloy**

| | |
|---|---|
| Ashland, Ky. A10 | 7.575 |
| Bessemer, Ala. T2 | 7.575 |
| Conshohocken, Pa. A3 | 7.575 |
| Ecorse, Mich. G5 | 7.575 |
| Fairfield, Ala. T2 | 7.575 |
| Farrell, Pa. S3 | 7.575 |
| Gary, Ind. U5 | 7.575 |
| Ind. Harbor, Ind. I-2, Y1 | 7.575 |
| Lackawanna, N.Y. B2 | 7.575 |
| Los Angeles (25) B3 | 8.325 |
| Seattle (25) B3 | 8.575 |
| Sharon, Pa. S3 | 7.575 |
| S. Chicago, Ill. W14 | 7.575 |
| S. San Francisco (25) B3 | 8.325 |
| Sparrows Point, Md. B2 | 7.575 |
| Warren, O. R2 | 7.575 |
| Weirton, W.Va. W6 | 7.575 |
| Youngstown U5, Y1 | 7.575 |

**STRIP, Hot-Rolled Ingot Iron**

| | |
|---|---|
| Ashland, Ky. (8) A10 | 5.35 |
| Warren, O. R2 | 5.875 |

**STRIP, Cold-Rolled Carbon**

| | |
|---|---|
| Anderson, Ind. G6 | 7.425 |
| Baltimore T6 | 7.425 |
| Boston T6 | 7.975 |
| Buffalo S40 | 7.425 |
| Cleveland A7, J5 | 7.425 |
| Dearborn, Mich. S3 | 7.425 |
| Detroit D2, M1, P20 | 7.425 |
| Dover, O. G6 | 7.425 |
| Evanston, Ill. M22 | 7.525 |
| Farrell, Pa. S3 | 7.425 |
| Follansbee, W.Va. W10 | 7.425 |
| Fontana, Calif. K1 | 9.20 |
| Franklin Park, Ill. T6 | 7.525 |
| Ind. Harbor, Ind. Y1 | 7.425 |
| Indianapolis S41 | 7.575 |
| Los Angeles C1, S41 | 9.30 |
| McKeesport, Pa. E10 | 7.525 |
| New Bedford, Mass. R10 | 7.875 |
| New Britain, Conn. S15 | 7.875 |
| New Castle, Pa. B4, E5 | 7.425 |
| New Haven, Conn. D2 | 7.875 |
| New Kensington, Pa. A6 | 7.425 |
| Pawtucket, R.I. R3 | 7.975 |
| Pawtucket, R.I. N8 | 7.975 |
| Philadelphia P24 | 7.875 |
| Pittsburgh J5 | 7.425 |
| Riverdale, Ill. A1 | 7.525 |
| Rome, N.Y. (32) R6 | 7.425 |
| Sharon, Pa. S3 | 7.425 |
| Trenton, N.J. (31) R5 | 8.875 |
| Wallingford, Conn. W2 | 7.875 |
| Warren, O. R2, T5 | 7.425 |
| Worcester, Mass. A7 | 7.975 |

**STRIP, Cold-Rolled Alloy**

| | |
|---|---|
| Boston T6 | 15.90 |
| Carnegie, Pa. S18 | 15.55 |
| Cleveland A7 | 15.55 |
| Dover, O. G6 | 15.55 |
| Farrell, Pa. S3 | 15.55 |
| Franklin Park, Ill. T6 | 15.55 |
| Harrison, N.J. S18 | 15.55 |
| Indianapolis S41 | 15.70 |
| Los Angeles S41 | 17.75 |
| Lowellville, O. S3 | 15.55 |
| Pawtucket, R.I. N8 | 15.90 |
| Riverdale, Ill. A1 | 15.55 |
| Sharon, Pa. S3 | 15.55 |
| Worcester, Mass. A7 | 15.85 |
| Youngstown S41 | 15.55 |

**STRIP, Cold-Rolled High-Strength, Low-Alloy**

| | |
|---|---|
| Cleveland A7 | 10.80 |
| Dearborn, Mich. S3 | 10.80 |
| Dover, O. G6 | 10.80 |
| Farrell, Pa. S3 | 10.80 |
| Ind. Harbor, Ind. Y1 | 10.80 |
| Sharon, Pa. S3 | 10.80 |
| Warren, O. R2 | 10.80 |
| Weirton, W.Va. W6 | 10.80 |
| Youngstown Y1 | 10.80 |

**STRIP, Cold-Rolled Ingot Iron**

| | |
|---|---|
| Warren, O. R2 | 8.175 |

**STRIP, C.R., Electrogalvanized**

| | |
|---|---|
| Cleveland A7 | 7.425* |
| Dover, O. G6 | 7.425* |
| Evanston, Ill. M22 | 7.525* |
| McKeesport, Pa. E10 | 7.50* |
| Riverdale, Ill. A1 | 7.525* |
| Warren, O. B9, S3, T5 | 7.425* |
| Worcester, Mass. A7 | 7.975 |
| Youngstown S41, Y1 | 7.425* |

*Plus galvanizing extras.

**STRIP, Galvanized (Continuous)**

| | |
|---|---|
| Farrell, Pa. S3 | 7.50 |
| Sharon, Pa. S3 | 7.50 |

**TIGHT COOPERAGE HOOP**

| | |
|---|---|
| Atlanta A11 | 5.825 |
| Farrell, Pa. S3 | 5.525 |
| Riverdale, Ill. A1 | 5.675 |
| Sharon, Pa. S3 | 5.525 |
| Youngstown U5 | 5.525 |

**STRIP, Cold-Finished Spring Steel (Annealed)**

| | 0.26-0.40C | 0.41-0.60C | 0.61-0.80C | 0.81-1.05C | 1.06-1.35C |
|---|---|---|---|---|---|
| Baltimore T6 | 9.50 | 10.70 | 12.90 | 15.90 | 18.85 |
| Boston T6 | 9.50 | 10.70 | 12.90 | 15.90 | 18.85 |
| Bristol, Conn. W1 | .... | 10.70 | 12.90 | 16.10 | 19.30 |
| Carnegie, Pa. S18 | 8.95 | 10.40 | 12.60 | 15.60 | .... |
| Cleveland A7 | 8.95 | 10.40 | 12.60 | 15.60 | 18.55 |
| Dearborn, Mich. S3 | 9.05 | 10.50 | 12.70 | .... | .... |
| Detroit D2 | 9.05 | 10.50 | 12.70 | 15.70 | .... |
| Dover, O. G6 | 8.95 | 10.40 | 12.60 | 15.60 | 18.55 |
| Evanston, Ill. M22 | 8.95 | 10.40 | 12.60 | 15.60 | .... |
| Farrell, Pa. S3 | 8.95 | 10.40 | 12.60 | 15.60 | 18.55 |
| Fostoria, O. S1 | 10.05 | 10.40 | 12.60 | 15.60 | .... |
| Franklin Park, Ill. T6 | 9.05 | 10.40 | 12.60 | 15.60 | 18.55 |
| Harrison, N.J. C18 | .... | .... | 12.90 | 16.10 | 19.30 |
| Indianapolis S41 | 9.10 | 10.55 | 12.60 | 15.60 | 18.55 |
| Los Angeles C1 | 11.15 | 12.60 | 14.80 | 17.80 | .... |
| Los Angeles S41 | 11.15 | 12.60 | 14.80 | .... | .... |
| New Britain, Conn. S15 | 9.40 | 10.70 | 12.90 | 15.90 | 18.85 |
| New Castle, Pa. B4, E5 | 8.95 | 10.40 | 12.60 | 15.60 | .... |
| New Haven, Conn. D2 | 9.40 | 10.70 | 12.90 | 15.90 | .... |
| New Kensington, Pa. A6 | 9.85 | 10.40 | 12.60 | 15.60 | .... |
| New York W3 | .... | 10.70 | 12.90 | 16.10 | 19.30 |
| Pawtucket, R.I. N8 | 9.50 | 10.70 | 12.90 | 15.90 | 18.85 |
| Riverdale, Ill. A1 | 9.05 | 10.40 | 12.60 | 15.60 | 18.55 |
| Rome, N.Y. R6 | 8.95 | 10.40 | 12.60 | 15.60 | 18.55 |
| Sharon, Pa. S3 | 8.95 | 10.40 | 12.60 | 15.60 | 18.55 |
| Trenton, N.J. R5 | .... | 10.70 | 12.90 | 15.90 | 18.85 |
| Wallingford, Conn. W2 | 9.40 | 10.70 | 12.90 | 15.90 | 18.75 |
| Warren, O. T5 | 8.95 | 10.40 | 12.60 | 15.60 | 18.55 |
| Worcester, Mass. A7, T6 | 9.50 | 10.70 | 12.90 | 15.90 | 18.85 |
| Youngstown S41 | 8.95 | 10.40 | 12.60 | 15.60 | 18.55 |

**Spring Steel (Tempered)**

| | 0.80C | 1.05C | 1.35C |
|---|---|---|---|
| Bristol, Conn. W1 | 18.85 | 22.95 | 27.80 |
| Buffalo W12 | 18.85 | .... | .... |
| Fostoria, O. S1 | 19.05 | 22.15 | .... |
| Franklin Park, Ill. T6 | 19.20 | 23.30 | 28.15 |
| Harrison, N.J. C18 | 18.85 | 22.95 | 27.80 |
| New York W3 | 18.85 | 22.95 | 27.80 |
| Palmer, Mass. W12 | 18.85 | .... | .... |
| Trenton, N.J. R5 | 18.85 | 22.95 | 27.80 |
| Worcester, Mass. A7, T6 | 18.85 | 22.95 | 27.80 |
| Youngstown S41 | 19.20 | 23.30 | 28.15 |

## TIN MILL PRODUCTS

| TIN PLATE, Electrolytic (Base Box) | 0.25 lb | 0.50 lb | 0.75 lb |
|---|---|---|---|
| Aliquippa, Pa. J5 | $9.10 | $9.35 | $9.75 |
| Fairfield, Ala. T2 | 9.20 | 9.45 | 9.85 |
| Fairless, Pa. U5 | 9.20 | 9.45 | 9.85 |
| Fontana, Calif. K1 | 9.75 | 10.00 | 10.40 |
| Gary, Ind. U5 | 9.10 | 9.35 | 9.75 |
| Granite City, Ill. G4 | 9.20 | 9.45 | 9.60 |
| Indiana Harbor, Ind. I-2, Y1 | 9.10 | 9.35 | 9.75 |
| Irvin, Pa. U5 | 9.10 | 9.35 | 9.75 |
| Niles, O. R2 | 9.10 | 9.35 | 9.75 |
| Pittsburg, Calif. C11 | 9.75 | 10.00 | 10.40 |
| Sparrows Point, Md. B2 | 9.10 | 9.35 | 9.75 |
| Weirton, W.Va. W6 | 9.10 | 9.35 | 9.75 |
| Yorkville, O. W10 | 9.10 | 9.35 | 9.75 |

**ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)**

| | | | |
|---|---|---|---|
| Aliquippa, Pa. J5 (21-27 Ga.) | 7.90 | 8.10 | .... |
| Indiana Harbor, Ind. Y1 (20-27 Ga.) | 7.90 | .... | .... |
| Niles, O. R2 (20-27 Ga.) | 7.90 | 8.10 | 8.30 |

| TIN PLATE, Hot Dipped Comon Coke | 1.25 lb | 1.50 lb |
|---|---|---|
| Aliquippa, Pa. J5 | $10.40 | $10.65 |
| Fairfield, Ala. T2 | 10.50 | 10.75 |
| Fontana, Calif. K1 | 11.05 | 11.30 |
| Gary, Ind. U5 | 10.40 | 10.65 |
| Ind. Harb. Y1 | 10.40 | 10.65 |
| Irvin, Pa. U5 | 10.40 | 10.65 |
| Pitts., Calif. C11 | 11.05 | 11.30 |
| Sp. Pt., Md. B2 | 10.40 | 10.65 |
| Weirton, W.Va. W6 | 10.40 | 10.65 |
| Yorkville, O. W10 | 10.40 | 10.65 |

**BLACK PLATE (Base Box)**

| | |
|---|---|
| Aliquippa, Pa. J5 | $8.20 |
| Fairfield, Ala. T2 | 8.30 |
| Fairless, Pa. U5 | 8.30 |
| Fontana, Calif. K1 | 8.85 |
| Gary, Ind. U5 | 8.20 |
| Granite City, Ill. G4 | 8.30 |
| Ind. Harbor, Ind. I-2, Y1 | 8.20 |
| Irvin, Pa. U5 | 8.20 |
| Niles, O. R2 | 8.20 |
| Pittsburg, Calif. C11 | 8.85 |
| Sparrows Point, Md. B2 | 8.20 |
| Weirton, W.Va. W6 | 8.20 |
| Yorkville, O. W10 | 8.20 |

**HOLLOWARE ENAMELING Black Plate (29 Gage)**

| | |
|---|---|
| Aliquippa, Pa. J5 | 7.85 |
| Gary, Ind. U5 | 7.85 |
| Granite City, Ill. G4 | 7.95 |
| Ind. Harbor, Ind. Y1 | 7.85 |
| Irvin, Pa. U5 | 7.85 |
| Yorkville, O. W10 | 7.85 |

**MANUFACTURING TERNES (Special Coated, Base Box)**

| | |
|---|---|
| Gary, Ind. U5 | $10.05 |
| Irvin, Pa. U5 | 10.05 |

## SILICON STEEL

**C.R. COILS & CUT LENGTHS (22 Ga.)**

| Fully Processed (Semiprocessed ½c lower) | Field | Armatures | Electric | Motor | Dynamo |
|---|---|---|---|---|---|
| Beech Bottom, W.Va. W10 | .... | 11.70 | 12.40 | 13.35 | 14.65 |
| Brackenridge, Pa. A4 | .... | .... | 12.40 | 13.55 | 14.65 |
| Granite City, Ill. G4 | 9.975* | 11.30* | 12.00* | 13.15* | .... |
| Indiana Harbor, Ind. I-2 | 9.875* | 11.20* | 11.90* | 13.05* | .... |
| Mansfield, O. E6 | 9.875* | 11.70 | 12.40 | 13.55 | 14.65 |
| Newport, Ky. A2 | 9.875 | 11.70* | 12.40* | 13.55* | 14.65* |
| Niles, O. M21 | 9.875* | 11.70 | 12.40 | 13.55 | .... |
| Vandergrift, Pa. U5 | 9.875* | 11.70 | 12.40 | 13.55 | 14.65 |
| Warren, O. R2 | 9.875* | 11.70 | 12.40 | 13.55 | 14.65 |
| Zanesville, O. A10 | .... | 11.70† | 12.40 | 13.55 | 14.65 |

| | Stator |
|---|---|
| Vandergrift, Pa. U5 | 8.10 |
| Mansfield, O. E6 | 8.10 |
| Warren, O. R2 (Silicon Lowcore) | 8.10 |

**SHEETS (22 Ga., coils & cut lengths)**

| Fully Processed (Semiprocessed ½c lower) | T-72 | T-65 | T-58 | T-52 |
|---|---|---|---|---|
| Beech Bottom, W.Va. W10 | 15.70 | 16.30 | 16.80 | 17.85 |
| Vandergrift, Pa. U5 | 15.70 | 16.30 | 16.80 | 17.85 |
| Zanesville, O. A10 | 15.70 | 16.30 | 16.80 | 17.85 |

| C.R. COILS & CUT LENGTHS (22 Ga.) | Grain Oriented T-100 | T-90 | T-80 | T-73 | T-66 | T-72 |
|---|---|---|---|---|---|---|
| Brackenridge, Pa. A4 | .... | 18.10 | 19.70 | 20.20 | 20.70 | 15.70†† |
| Butler, Pa. A10 | .... | .... | 19.70 | 20.20 | 20.70 | .... |
| Vandergrift, Pa. U5 | 17.10 | 18.10 | 19.70 | 20.20 | 20.70 | 15.70 |
| Warren, O. R2 | .... | .... | .... | .... | .... | 15.70‡ |

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

## WIRE

**WIRE, Manufacturers Bright, Low Carbon**

| | |
|---|---|
| Alabama City, Ala. R2 | 8.00 |
| Aliquippa, Pa. J5 | 8.00 |
| Alton, Ill. L1 | 8.20 |
| Atlanta A1 | 8.00 |
| Bartonville, Ill. K4 | 8.10 |
| Buffalo W12 | 8.00 |
| Chicago W13 | 8.00 |
| Cleveland A7, C20 | 8.00 |
| Crawfordsville, Ind. M8 | 8.10 |
| Donora, Pa. A7 | 8.00 |
| Duluth A7 | 8.00 |
| Fairfield, Ala. T2 | 8.00 |
| Fostoria, O. (24) S1 | 8.10 |
| Houston S5 | 8.25 |
| Jacksonville, Fla. M8 | 8.35 |
| Johnstown, Pa. B2 | 8.00 |
| Joliet, Ill. A7 | 8.00 |
| Kansas City, Mo. S5 | 8.25 |
| Kokomo, Ind. C16 | 8.10 |
| Los Angeles B3 | 8.95 |
| Minnequa, Colo. C10 | 8.25 |
| Monessen, Pa. P7, P16 | 8.00 |
| Palmer, Mass. W12 | 8.30 |
| Pittsburg, Calif. C11 | 8.95 |
| Portsmouth, O. P12 | 8.00 |
| Rankin, Pa. A7 | 8.00 |
| S. Chicago, Ill. R2 | 8.00 |
| S. San Francisco C10 | 8.95 |
| Sparrows Point, Md. B2 | 8.10 |
| Sterling, Ill. (1) N15 | 8.00 |
| Sterling, Ill. N15 | 8.10 |
| Struthers, O. Y1 | 8.00 |
| Waukegan, Ill. A7 | 8.00 |
| Worcester, Mass. A7 | 8.30 |

**WIRE, Cold Heading Carbon**

| | |
|---|---|
| Elyria, O. W8 | 8.00 |

**WIRE, Gal'd., for ACSR**

| | |
|---|---|
| Bartonville, Ill. K4 | 12.65 |
| Buffalo W12 | 13.40 |
| Cleveland A7 | 12.65 |
| Donora, Pa. A7 | 12.65 |
| Duluth A7 | 12.65 |
| Johnstown, Pa. B2 | 13.40 |
| Kansas City, Mo. U3 | 12.90 |
| Minnequa, Colo. C10 | 12.775 |
| Monessen, Pa. P7, P16 | 12.60 |
| Muncie, Ind. I-7 | 13.60 |
| New Haven, Conn. A7 | 12.95 |
| Palmer, Mass. W12 | 13.70 |
| Pittsburg, Calif. C11 | 13.45 |
| Portsmouth, O. P12 | 12.65 |
| Roebling, N.J. R5 | 12.95 |
| Sparrows Pt., Md. B2 | 13.50 |
| Struthers, O. Y1 | 13.40 |
| Trenton, N.J. A7 | 12.95 |
| Waukegan, Ill. A7 | 12.65 |
| Worcester, Mass. A7 | 12.95 |

**WIRE, Upholstery Spring**

| | |
|---|---|
| Aliquippa, Pa. J5 | 9.75 |
| Alton, Ill. L1 | 9.95 |
| Buffalo W12 | 9.75 |
| Cleveland A7 | 9.75 |
| Donora, Pa. A7 | 9.75 |
| Duluth A7 | 9.75 |
| Johnstown, Pa. B2 | 9.75 |
| Kansas City, Mo. S5, U3 | 10.00 |
| Kokomo, Ind. C16 | 9.85 |
| Los Angeles B3 | 10.70 |
| Minnequa, Colo. C10 | 9.95 |
| Monessen, Pa. P7, P16 | 9.75 |
| New Haven, Conn. A7 | 10.05 |
| Palmer, Mass. W12 | 10.05 |
| Pittsburg, Calif. C11 | 10.70 |
| Portsmouth, O. P12 | 9.75 |
| Roebling, N.J. R5 | 10.05 |
| S. Chicago, Ill. R2 | 9.75 |
| S. San Francisco C10 | 10.70 |
| Sparrows Pt., Md. B2 | 9.85 |
| Struthers, O. Y1 | 9.75 |
| Trenton, N.J. A7 | 10.05 |
| Waukegan, Ill. A7 | 9.75 |
| Worcester, Mass. A7, J4, T6 | 10.05 |

**WIRE, Fine & Weaving (8" Coils)**

| | |
|---|---|
| Alton, Ill. L1 | 16.50 |
| Bartonville, Ill. K4 | 16.40 |
| Chicago W13 | 16.30 |
| Cleveland A7 | 16.30 |
| Crawfordsville, Ind. M8 | 16.40 |
| Fostoria, O. S1 | 16.30 |
| Houston S5 | 16.55 |
| Jacksonville, Fla. M8 | 16.65 |
| Johnstown, Pa. B2 | 16.30 |
| Kansas City, Mo. S5 | 16.55 |
| Kokomo, Ind. C16 | 16.30 |
| Minnequa, Colo. C16 | 16.55 |
| Monessen, Pa. P16 | 16.30 |
| Muncie, Ind. I-7 | 16.50 |
| Palmer, Mass. W12 | 16.60 |
| S. San Francisco C10 | 17.15 |
| Waukegan, Ill. A7 | 16.30 |
| Worcester, Mass. A7, J6 | 16.60 |

**WIRE, Tire Bead**

| | |
|---|---|
| Bartonville, Ill. K4 | 17.15 |
| Monessen, Pa. P16 | 17.15 |
| Roebling, N.J. R5 | 17.65 |

**ROPE WIRE (A)**

| | |
|---|---|
| Bartonville, Ill. K4 | 13.45 |
| Buffalo W12 | 13.45 |
| Fostoria, O. S1 | 13.45 |
| Kansas City, Mo. U3 | 13.70 |
| Johnstown, Pa. B2 | 13.45 |
| Monessen, Pa. P7 | 13.45 |
| Muncie, Ind. I-7 | 13.65 |
| Palmer, Mass. W12 | 13.75 |
| Portsmouth, O. P12 | 13.45 |
| Roebling, N.J. R5 | 13.75 |
| St. Louis L8 | 13.45 |
| Sparrows Pt., Md. B2 | 13.85 |
| Struthers, O. Y1 | 13.45 |
| Worcester, Mass. J4 | 13.75 |

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

**Wire, Cold-Rolled Flat**

| | |
|---|---|
| Anderson,Ind. G6 | ....12.35 |
| Baltimore T6 | .....12.65 |
| Boston T6 | .....12.65 |
| Buffalo W12 | .....12.35 |
| Chicago W13 | .....12.45 |
| Cleveland A7 | .....12.35 |
| Crawfordsville,Ind. M8 | .12.35 |
| Dover,O. G6 | .....12.35 |
| Farrell,Pa. S3 | .....12.35 |
| Fostoria,O. S1 | .....12.35 |
| FranklinPark,Ill. T6 | ...12.45 |
| Kokomo,Ind. C16 | ....12.35 |
| Massillon,O. R8 | .....12.35 |
| Milwaukee C23 | .....12.55 |
| Monessen,Pa. P7, P16 | ..12.35 |
| Palmer,Mass. W12 | ....12.65 |
| Pawtucket,R.I. N8 | ....12.65 |
| Philadelphia P24 | .....12.65 |
| Riverdale,Ill. A1 | .....12.45 |
| Rome,N.Y. R6 | .....12.35 |
| Sharon,Pa. S3 | .....12.35 |
| Trenton,N.J. R5 | .....12.65 |
| Warren,O. B9 | .....12.35 |
| Worcester,Mass. A7,T6 | .12.65 |

**NAILS, Stock** — **Col.**

| | |
|---|---|
| AlabamaCity,Ala. R2 | ...173 |
| Aliquippa,Pa. J5 | .....173 |
| Atlanta A11 | .....175 |
| Bartonville,Ill. K4 | .....175 |
| Chicago W13 | .....173 |
| Cleveland A9 | .....173 |
| Crawfordsville,Ind. M8 | ...175 |
| Donora,Pa. A7 | .....173 |
| Duluth A7 | .....173 |
| Fairfield,Ala. T2 | .....173 |
| Houston S5 | .....178 |
| Jacksonville,Fla. M8 | ....175 |
| Johnstown,Pa. B2 | .....173 |
| Joliet,Ill. A7 | .....173 |
| KansasCity,Mo. S5 | .....178 |
| Kokomo,Ind. C16 | .....175 |
| Minnequa,Colo. C10 | ....178 |
| Monessen,Pa. P7 | .....173 |
| Pittsburg,Calif. C11 | .....192 |
| Rankin,Pa. A7 | .....173 |
| S.Chicago,Ill. R2 | .....173 |
| SparrowsPt.,Md. B2 | ....175 |
| Sterling,Ill.(7) N15 | .....175 |
| Worcester,Mass. A7 | .....181 |

**TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150**

| | |
|---|---|
| AlabamaCity,Ala. R2 | $8.78 |
| Atlanta A11 | .....10.36 |
| Bartonville,Ill. K4 | .....8.88 |
| Buffalo W12 | .....10.26 |
| Chicago W13 | .....9.24 |
| Crawfordsville,Ind. M8 | ..9.34 |
| Donora,Pa. A7 | .....8.78 |
| Duluth A7 | .....8.78 |
| Fairfield,Ala. T2 | .....8.78 |
| Houston S5 | .....10.51 |
| Jacksonville,Fla. M8 | ....9.34 |
| Johnstown,Pa. B2 | .....8.78 |
| Joliet,Ill. A7 | .....8.78 |
| KansasCity,Mo. S5 | ....10.51 |
| Kokomo,Ind. C16 | .....8.88 |
| LosAngeles B3 | .....9.44 |
| Minnequa,Colo. C10 | ....9.49 |
| Pittsburg,Calif. C11 | ....9.44 |
| S.Chicago,Ill. R2 | .....8.78 |
| S.SanFrancisco C10 | ....9.94 |
| SparrowsPt.,Md. B2 | ....8.88 |
| Sterling,Ill.(37) N15 | ....8.88 |

**Coil No. 6500 Stand.**

| | |
|---|---|
| AlabamaCity,Ala. R2 | .$9.06 |
| Atlanta A11 | .....10.70 |
| Bartonville,Ill. K4 | .....9.16 |
| Buffalo W12 | .....10.60 |
| Chicago W13 | .....9.54 |
| Crawfordsville,Ind. M8 | ..9.64 |
| Donora,Pa. A7 | .....9.06 |
| Duluth A7 | .....9.06 |
| Fairfield,Ala. T2 | .....9.06 |
| Houston S5 | .....10.85 |
| Jacksonville,Fla. M8 | ....9.64 |
| Johnstown,Pa. B2 | .....9.06 |
| Joliet,Ill. A7 | .....9.06 |
| KansasCity,Mo. S5 | ....10.85 |
| Kokomo,Ind. C16 | .....9.16 |
| LosAngeles B3 | .....9.75 |
| Minnequa,Colo. C10 | ....9.79 |
| Pittsburg,Calif. C11 | ....9.75 |
| S.Chicago,Ill. R2 | .....9.06 |
| S.SanFrancisco C10 | ....10.26 |
| SparrowsPt.,Md. B2 | ....9.16 |
| Sterling,Ill.(37) N15 | ...9.16 |

**Coil No. 6500 Interim**

| | |
|---|---|
| AlabamaCity,Ala. R2 | .$9.11 |
| Atlanta A11 | .....10.75 |
| Bartonville,Ill. K4 | .....9.21 |
| Buffalo W12 | .....10.65 |
| Chicago W13 | .....9.59 |
| Crawfordsville,Ind. M8 | ..9.69 |
| Donora,Pa. A7 | .....9.11 |
| Duluth A7 | .....9.11 |
| Fairfield,Ala. T2 | .....9.11 |
| Houston S5 | .....10.90 |
| Jacksonville,Fla. M8 | ....9.69 |
| Johnstown,Pa. B2 | .....9.11 |
| Joliet,Ill. A7 | .....9.11 |
| KansasCity,Mo. S5 | ....10.96 |
| Kokomo,Ind. C16 | .....9.21 |
| LosAngeles B3 | .....9.80 |
| Minnequa,Colo. C10 | ....9.84 |
| Pittsburg,Calif. C11 | ....9.80 |
| S.Chicago,Ill. R2 | .....9.11 |
| S.SanFrancisco C10 | ....10.31 |
| SparrowsPt.,Md. B2 | ...9.21 |
| Sterling,Ill.(37) N15 | ....9.21 |

**BALE TIES, Single Loop** — **Col.**

| | |
|---|---|
| AlabamaCity,Ala. R2 | ...212 |
| Atlanta A11 | .....214 |
| Bartonville,Ill. K4 | .....214 |
| Crawfordsville,Ind. M8 | ..214 |
| Donora,Pa. A7 | .....212 |
| Duluth A7 | .....212 |
| Fairfield,Ala. T2 | .....212 |
| Houston S5 | .....217 |
| Jacksonville,Fla. M8 | ....214 |
| Joliet,Ill. A7 | .....212 |
| KansasCity,Mo. S5 | .....217 |
| Kokomo,Ind. C16 | .....214 |
| Minnequa,Colo. C10 | ....217 |
| Pittsburg,Calif. C11 | ....236 |
| S.SanFrancisco C10 | .....236 |
| SparrowsPt.,Md. B2 | ....214 |
| Sterling,Ill.(7) N15 | .....214 |

**FENCE POSTS** — **Col.**

| | |
|---|---|
| Birmingham C15 | .....177 |
| ChicagoHts.,Ill. C2, I-2 | ..177 |
| Duluth A7 | .....177 |
| Franklin,Pa. F5 | .....177 |
| Johnstown,Pa. B2 | .....177 |
| Marion,O. P11 | .....177 |
| Minnequa,Colo. C10 | ....182 |
| Tonawanda,N.Y. B12 | ...177 |

**WIRE, Barbed** — **Col.**

| | |
|---|---|
| AlabamaCity,Ala. R2 | .193** |
| Aliquippa,Pa. J5 | .....190§ |
| Atlanta A11 | .....198§ |
| Bartonville,Ill. K4 | .....199 |
| Crawfordsville,Ind. M8 | ..198 |
| Donora,Pa. A7 | .....193† |
| Duluth A7 | .....193† |
| Fairfield,Ala. T2 | .....193† |
| Houston S5 | .....198** |
| Jacksonville,Fla. M8 | ....198 |
| Johnstown,Pa. B2 | .....196§ |
| Joliet,Ill. A7 | .....193† |
| KansasCity,Mo. S5 | ....198** |
| Kokomo,Ind. C16 | .....195† |
| Minnequa,Colo. C10 | ...198** |
| Monessen,Pa. P7 | .....196§ |
| Pittsburg,Calif. C11 | ....213† |
| Rankin,Pa. A7 | .....193† |
| S.Chicago,Ill. R2 | .....193** |
| S.SanFrancisco C10 | ...213* |
| SparrowsPoint,Md. B2 | .198§ |
| Sterling,Ill.(7) N15 | .....198 |

**WOVEN FENCE, 9-15 Ga.** — **Col.**

| | |
|---|---|
| Ala.City,Ala. R2 | .....187** |
| Aliq'ppa,Pa.9-11½ga.J5 | 190§ |
| Atlanta A11 | .....192§ |
| Bartonville,Ill. K4 | .....193 |
| Crawfordsville,Ind. M8 | ..192 |
| Donora,Pa. A7 | .....187† |
| Duluth A7 | .....187† |
| Fairfield,Ala. T2 | .....187† |
| Houston S5 | .....192** |
| Jacksonville,Fla. M8 | ....192 |
| Johnstown,Pa.(43) B2 | ..190§ |
| Joliet,Ill. A7 | .....187† |
| KansasCity,Mo. S5 | ....192** |
| Kokomo,Ind. C16 | .....189† |
| Minnequa,Colo. C10 | ...192** |
| Pittsburg,Calif. C11 | ....210† |
| Rankin,Pa. A7 | .....187† |
| S.Chicago,Ill. R2 | .....187** |
| Sterling,Ill.(7) N15 | .....192 |

| **WIRE (16 gage)** | **An'ld Galv. Stone** | **Stone** |
|---|---|---|
| Ala.City,Ala.R2 | 17.85 | 19.40** |
| Aliq'ppa,Pa. J5 | ..17.85 | 19.65 |
| Bartonville K4 | ...17.95 | 19.80 |
| Cleveland A7 | ....17.85 | .... |
| Craw'dville M8 | 17.95 | 19.80‡‡ |
| Fostoria,O. S1 | ..18.35 | 19.90† |
| Houston S5 | ....18.10 | 19.65** |
| Jacksonville M8 | 18.95 | 19.80‡‡ |
| Johnstown B2 | ..17.85 | 19.65§ |
| Kan.City,Mo. S5 | 18.10 | .... |
| Kokomo C16 | ...17.95 | 19.50† |
| Minnequa C10 | 18.10 | 19.65** |
| P'lm'r,Mass.W12 | 18.15 | 19.70† |
| Pitts.,Calif. C11 | 18.20 | 19.75† |
| S.SanFran.C10 | 18.20 | 19.75** |
| St'ling(37) N15 | ..17.95 | 19.80 |
| SparrowsPt. B2 | ..17.95 | 19.75§ |
| Waukegan A7 | ..17.85 | 19.40† |
| Worcester A7 | ....18.15 | .... |

**WIRE, Merchant Quality (6 to 8 gage)** — **An'ld Galv.**

| | |
|---|---|
| Ala.City,Ala. R2 | .9.00 | 9.55** |
| Aliquippa J5 | ....8.65 | 9.325§ |
| Atlanta(48)A11 | ..9.10 | 9.775§ |
| Bartonville(48) K4 | .9.85 | 19.90 |
| Buffalo W12 | ....9.00 | 9.55† |
| Cleveland A7 | ....9.00 | .... |
| Crawfordsville M8 | 9.10 | 9.80†† |
| Donora,Pa. A7 | ...9.00 | 9.55† |
| Duluth A7 | ....9.00 | 9.55† |
| Fairfield T2 | ....9.00 | 9.55† |
| Houston(48) S5 | ..9.25 | 9.80** |
| Jack'ville,Fla. M8 | 9.10 | 9.80‡‡ |
| Johnstown(48) B2 | 9.00 | 9.675§ |
| Joliet,Ill. A7 | ....9.00 | 9.55† |
| KansasCity(48)S5 | 9.25 | 9.80** |
| Kokomo(48) S16 | ..9.10 | 9.65† |
| LosAngeles B3 | .9.95 | 10.625§ |
| Minnequa C10 | ...9.25 | 9.80** |
| Monessen(48) P7 | .8.65 | 9.35§ |
| Palmer,Mass. W12 | 9.30 | 9.85† |
| Pitts.,Calif. C11 | ..9.95 | 10.50† |
| Rankin,Pa. A7 | ...9.00 | 9.55† |
| S.Chicago R2 | ....9.00 | 9.55** |
| S.SanFran. C10 | ..9.95 | 10.50** |
| Spar'wsPt.(48)B2 | 9.10 | 9.775§ |
| St'ling(37)(48) N15 | 9.10 | 9.80 |
| Struthers,O. Y1 | ..9.00 | 9.65‡ |
| Worcester,Mass.A7 | 9.30 | 9.85† |

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

## FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

**HEX HEAD CAP SCREWS,** coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

| | |
|---|---|
| Plain Finish | 50 |
| Hot Galvanized and Zinc Plated: | |
| Packaged | 43.75 |
| Bulk | 50 |

**BOLTS,** standard stock sizes:

| | |
|---|---|
| Plain Finish | 50 |
| Hot Galvanized and zinc Plated: | |
| Packaged | 43.75 |
| *Bulk | 50 |

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

**HEXAGON NUTS, American Standard:** Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

**SQUARE NUTS, American Standard:** Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

| | |
|---|---|
| Plain Finish | 50 |
| Hot Galvanized and Zinc Plated: | |
| Packaged | 43.75 |
| Bulk | 50 |

**CAP AND SETSCREWS, Fillister Head, Cap Screws, Coarse Thread:**

| | |
|---|---|
| Packages | +55 |
| Bulk | +16 |
| **Flat Head Cap Screws:** ¾ in. and smaller, 6 in. and shorter: | |
| Packages | +85 |
| Bulk | +38 |
| **Setscrews, Square Head, Cup Point, Coarse Thread:** Through 1 in. diam, 6 in. and shorter: | |
| Packages | + 5 |
| Bulk | +19 |
| Through 1 in. diam., longer than 6 in.: | |
| Packages | +29 |

## RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

⅞ in. and smaller by 6 in. and shorter: 15% off list.

## PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

| | Standard Diameter, Inches | | | | |
|---|---|---|---|---|---|
| | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 |
| Alton,Ill. L1 | $28.95 | $43.40 | $55.40 | $73.00 | $95.10 |
| Buffalo W12 | 28.95 | 43.40 | 55.40 | 73.00 | 95.10 |
| Cleveland A7 | 28.95 | 43.40 | 55.40 | 73.00 | .... |
| KansasCity,Mo. U3 | 29.85 | 43.00 | 55.40 | 73.00 | 95.10 |
| Monessen,Pa. P16 | 32.15 | 48.20 | 61.55 | 81.10 | 105.65 |
| N'wHaven,Conn. A7 | 28.95 | 43.40 | 55.40 | 73.00 | 95.10 |
| Pittsburg,Calif. C11 | 28.95 | 43.40 | 55.40 | 73.00 | 95.10 |
| Minnequa,Colo. C10 | 28.95 | 43.40 | 55.40 | 73.00 | 95.10 |
| Roebling,N.J. R5 | 28.95 | 43.40 | 55.40 | 73.00 | 95.10 |
| SparrowsPoint,Md. B2 | 28.95 | 43.40 | 55.40 | 73.00 | 95.10 |
| St. Louis L8 | 28.95 | 43.40 | 55.40 | 73.00 | 95.10 |
| Waukegan,Ill. A7 | 28.95 | 43.40 | 55.40 | 73.00 | 95.10 |

## BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

| O.D. In. | B.W. Gage | Seamless H.R. | Seamless C.D. | Elec. Weld H.R. |
|---|---|---|---|---|
| 1 | 13 | .... | 27.24 | 23.13 |
| 1¼ | 13 | .... | 32.25 | 24.41 |
| 1½ | 13 | 30.42 | 35.65 | 26.98 |
| 1¾ | 13 | 35.94 | 42.12 | 31.89 |
| 2 | 13 | 40.28 | 47.21 | 35.74 |
| 2¼ | 13 | 45.36 | 53.17 | 40.26 |
| 2½ | 12 | 49.24 | 57.72 | 43.70 |
| 2½ | 12 | 54.23 | 63.57 | 48.13 |
| 2¾ | 12 | 58.73 | 68.83 | 52.13 |
| 3 | 12 | 62.62 | 73.40 | 55.59 |

## RAILWAY MATERIALS

| | Standard No. 1 | Standard No. 2 | All No. 2 | Toe Rails 60 lb Under |
|---|---|---|---|---|
| Bessemer,Pa. U5 | 5.75 | 5.60 | .... | 6.725 |
| Ensley,Ala. T2 | 5.75 | 5.65 | .... | 6.725 |
| Fairfield,Ala. T2 | .... | .... | .... | 6.725 |
| Gary,Ind. U5 | 5.75 | 5.65 | .... | .... |
| Huntington,W.Va. C15 | .... | .... | .... | 6.725 |
| Johnstown,Pa. B2 | .... | .... | .... | (16)6.725 |
| Lackawanna,N.Y. B2 | 5.75 | 5.65 | .... | 6.725 |
| Minnequa,Colo. C10 | 5.75 | 5.65 | .... | 7.225 |
| Steelton,Pa. B2 | 5.75 | 5.65 | .... | .... |
| Williamsport,Pa. S19 | .... | .... | .... | 6.725 |

**TIE PLATES**

| | |
|---|---|
| Fairfield,Ala. T2 | .....6.875 |
| Gary,Ind. U5 | .....6.875 |
| Lackawanna,N.Y. B2 | ..6.875 |
| Minnequa,Colo. C10 | ...6.875 |
| Seattle B3 | .....7.025 |
| Steelton,Pa. B2 | .....6.875 |
| Torrance,Calif. C11 | ...6.875 |

**JOINT BARS**

| | |
|---|---|
| Bessemer,Pa. U5 | .....7.25 |
| Fairfield,Ala. T2 | .....7.25 |
| Joliet,Ill. U5 | .....7.25 |
| Lackawanna,N.Y. B2 | ..7.25 |
| Minnequa,Colo. C10 | ...7.25 |
| Steelton,Pa. B2 | .....7.25 |

**AXLES**

| | |
|---|---|
| Ind.Harbor,Ind. S13 | ..9.125 |
| Johnstown,Pa. B2 | ....9.125 |

**TRACK BOLTS, Untreated**

| | |
|---|---|
| Cleveland R2 | .....15.35 |
| KansasCity,Mo. S5 | ....15.35 |
| Lebanon,Pa. B2 | .....15.35 |
| Minnequa,Colo. C10 | ...15.35 |
| Pittsburgh S44 | .....15.35 |
| Seattle B3 | .....15.85 |

**SCREW SPIKES**

| | |
|---|---|
| Lebanon,Pa. B2 | .....15.10 |

**STANDARD TRACK SPIKES**

| | |
|---|---|
| Fairfield,Ala. T2 | ....10.10 |
| Ind.Harbor,Ind. I-2, Y1 | .10.10 |
| KansasCity,Mo. S5 | ....10.10 |
| Lebanon,Pa. B2 | .....10.10 |
| Minnequa,Colo. C10 | ...10.10 |
| Pittsburgh J5 | .....10.10 |
| Seattle B3 | .....10.60 |
| S.Chicago,Ill. R2 | .....10.10 |
| Struthers,O. Y1 | .....10.10 |
| Youngstown R2 | .....10.10 |

**Footnotes**

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

## SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| Size—Inches | 2 | | 2½ | | 3 | | 3½ | | 4 | | 5 | | 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | | $1.48 | | $1.92 | |
| Pounds Per Ft | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | | 14.81 | | 19.18 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | +12.25 | +28.75 | +5.75 | +23.5 | +3.25 | +21 | +1.75 | +19.5 | +1.75 | +19.5 | +2 | +19.75 | 0.5 | +17.25 |
| Ambridge, Pa. N2 | +12.25 | .... | +5.75 | .... | +3.25 | .... | +1.75 | .... | +1.75 | .... | +2 | .... | 0.5 | .... |
| Lorain, O. N3 | +12.25 | +28.75 | +5.75 | +23.5 | +3.25 | +21 | +1.75 | +19.5 | +1.75 | +19.5 | +2 | +19.75 | 0.5 | +17.25 |
| Youngstown Y1 | +12.25 | +28.75 | +5.75 | +23.5 | +3.25 | +21 | +1.75 | +19.5 | +1.75 | +19.5 | +2 | +19.75 | 0.5 | +17.25 |

## ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Youngstown R2 | +12.25 | +28.75 | +5.75 | +23.5 | +3.25 | +21 | +1.75 | +19.5 | +1.75 | +19.5 | +2 | +19.75 | 0.5 | +17.25 |

## BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

| Size—Inches | ⅛ | | ¼ | | ⅜ | | ½ | | ¾ | | 1 | | 1¼ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 5.5c | | 6c | | 6c | | 8.5c | | 11.5c | | 17c | | 23c | |
| Pounds Per Ft | 0.24 | | 0.42 | | 0.57 | | 0.85 | | 1.13 | | 1.68 | | 2.28 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | .... | .... | .... | .... | .... | .... | 2.25 | +15 | 5.25 | +11 | 8.75 | +6.5 | 11.25 | +5.25 |
| Alton, Ill. L1 | .... | .... | .... | .... | .... | .... | 0.25 | +17 | 3.25 | +13 | 6.75 | +8.5 | 9.25 | +7.25 |
| Benwood, W. Va. W10 | 1.5 | +27 | +10.5 | +36 | +21 | +45.5 | 2.25 | +15 | 5.25 | +11 | 8.75 | +6.5 | 11.25 | +5.25 |
| Butler, Pa. P6 | 4.5 | +24 | +8.5 | +34 | +19.5 | +44 | .... | .... | .... | .... | .... | .... | .... | .... |
| Etna, Pa. N2 | .... | .... | .... | .... | .... | .... | 2.25 | +15 | 5.25 | +11 | 8.75 | +6.5 | 11.25 | +5.25 |
| Fairless, Pa. N3 | .... | .... | .... | .... | .... | .... | 0.25 | +17 | 3.25 | +13 | 6.75 | +8.5 | 9.25 | +7.25 |
| Fontana, Calif. K1 | .... | .... | .... | .... | .... | .... | +10.75 | +28 | +7.75 | +24 | +4.25 | +19.5 | +1.75 | +18.25 |
| Indiana Harbor, Ind. Y1 | .... | .... | .... | .... | .... | .... | 1.25 | +16 | 4.25 | +12 | 7.75 | +7.5 | 10.25 | +6.25 |
| Lorain, O. N3 | .... | .... | .... | .... | .... | .... | 2.25 | +15 | 5.25 | +11 | 8.75 | +6.5 | 11.25 | +5.25 |
| Sharon, Pa. S4 | 4.5 | +24 | +8.5 | +34 | +19.5 | +44 | .... | .... | .... | .... | .... | .... | .... | .... |
| Sharon, Pa. M6 | .... | .... | .... | .... | .... | .... | 2.25 | +15 | 5.25 | +11 | 8.75 | +6.5 | 11.25 | +5.25 |
| Sparrows Pt., Md. B2 | 2.5 | +26 | +10.5 | +36 | +21.5 | +46 | 0.25 | +17 | 3.25 | +13 | 6.75 | +8.5 | 9.25 | +7.25 |
| Wheatland, Pa. W9 | 4.5 | +24 | +8.5 | +34 | +19.5 | +44 | 2.25 | +15 | 5.25 | +11 | 8.75 | +6.5 | 11.25 | +5.25 |
| Youngstown R2, Y1 | .... | .... | .... | .... | .... | .... | 2.25 | +15 | 5.25 | +11 | 8.75 | +6.5 | 11.25 | +5.25 |

| Size—Inches | 1¼ | | 2 | | 2½ | | 3 | | 3½ | | 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| List Per Ft | 27.5c | | 37c | | 58.5c | | 76.5c | | 92c | | $1.09 | |
| Pounds Per Ft | 2.72 | | 3.68 | | 5.82 | | 7.62 | | 9.20 | | 10.89 | |
| | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* | Blk | Galv* |
| Aliquippa, Pa. J5 | 11.75 | +4.25 | 12.25 | +3.75 | 13.75 | +3.5 | 13.75 | +3.5 | 3.25 | +14.5 | 3.25 | +14.5 |
| Alton, Ill. L1 | 9.75 | +6.25 | 10.25 | +5.75 | 11.75 | +5.5 | 11.75 | +5.5 | 1.25 | +16.5 | 1.25 | +16.5 |
| Benwood, W. Va. W10 | 11.75 | +4.25 | 12.25 | +3.75 | 13.75 | +3.5 | 13.75 | +3.5 | 3.25 | +14.5 | 3.25 | +14.5 |
| Etna, Pa. N2 | 11.75 | +4.25 | 12.25 | +3.75 | 13.75 | +3.5 | 13.75 | +3.5 | 3.25 | +14.5 | 3.25 | +14.5 |
| Fairless, Pa. N3 | 9.75 | +6.25 | 10.25 | +5.75 | 11.75 | +5.5 | 11.75 | +5.5 | 1.25 | +16.5 | 1.25 | +16.5 |
| Fontana, Calif. K1 | +1.25 | +17.25 | +0.75 | +16.75 | 0.75 | +16.5 | 0.75 | +16.5 | +9.75 | +27.5 | +9.75 | +27.5 |
| Indiana Harbor, Ind. Y1 | 10.75 | +5.25 | 11.25 | +4.75 | 12.75 | +4.5 | 12.75 | +4.5 | 2.25 | +15.5 | 2.25 | +15.5 |
| Lorain, O. N3 | 11.75 | +4.25 | 12.25 | +3.75 | 13.75 | +3.5 | 13.75 | +3.5 | .... | .... | .... | .... |
| Sharon, Pa. M6 | 11.75 | +4.25 | 12.25 | +3.75 | 13.75 | +3.5 | 13.75 | +3.5 | .... | .... | .... | .... |
| Sparrows Pt., Md. B2 | 9.75 | +6.25 | 10.25 | +5.75 | 11.75 | +5.5 | 11.75 | +5.5 | 1.25 | +16.5 | 1.25 | +16.5 |
| Wheatland, Pa. W9 | 11.75 | +4.25 | 12.25 | +3.75 | 13.75 | +3.5 | 13.75 | +3.5 | 3.25 | +14.5 | 3.25 | +14.5 |
| Youngstown R2, Y1 | 11.75 | +4.25 | 12.25 | +3.75 | 13.75 | +3.5 | 13.75 | +3.5 | 3.25 | +14.5 | 3.25 | +14.5 |

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

# Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

| AISI Type | —Rerolling— Ingot | Slabs | Forging Billets | H.R. Strip | H.R. Rods; C.F. Wire | Bars; Structural Shapes | Plates | Sheets | C.R. Strip; Flat Wire |
|---|---|---|---|---|---|---|---|---|---|
| 201 | 22.75 | 25.00 | .... | 36.00 | .... | 43.50 | 39.25 | 48.50 | 45.00 |
| 202 | 24.75 | 28.25 | 37.75 | 39.00 | 42.25 | 44.50 | 40.00 | 49.25 | 49.25 |
| 301 | 24.00 | 26.00 | 38.75 | 37.25 | 43.50 | 46.00 | 41.25 | 51.25 | 47.50 |
| 302 | 26.25 | 29.50 | 39.50 | 40.50 | 44.25 | 46.75 | 42.25 | 52.00 | 52.00 |
| 302B | 26.50 | 30.75 | 42.25 | 45.75 | 46.75 | 49.00 | 44.50 | 57.00 | 57.00 |
| 303 | .... | 33.25 | 42.50 | .... | 47.25 | 49.75 | 45.00 | 56.75 | 56.75 |
| 304 | 28.00 | 31.25 | 42.00 | 43.75 | 47.00 | 49.50 | 45.75 | 55.00 | 55.00 |
| 304L | .... | .... | 49.75 | 51.50 | 54.75 | 57.25 | 53.50 | 62.75 | 62.75 |
| 305 | 29.50 | 34.75 | 44.00 | 47.50 | 47.00 | 49.50 | 46.25 | 58.75 | 58.75 |
| 308 | 32.00 | 36.25 | 49.00 | 50.25 | 54.75 | 57.75 | 55.25 | 63.00 | 63.00 |
| 309 | 41.25 | 47.50 | 60.00 | 64.50 | 66.25 | 69.50 | 66.00 | 80.50 | 80.50 |
| 310 | 51.50 | 59.50 | 81.00 | 84.25 | 89.75 | 94.50 | 87.75 | 96.75 | 96.75 |
| 314 | .... | .... | 80.50 | .... | 89.75 | 94.50 | 87.75 | .... | 104.25 |
| 316 | 41.25 | 47.50 | 64.50 | 68.50 | 71.25 | 75.75 | 71.75 | 80.75 | 80.75 |
| 316L | .... | .... | 72.25 | 76.25 | 79.50 | 83.50 | 79.50 | 88.50 | 88.50 |
| 317 | 49.75 | 58.00 | 79.75 | 88.25 | 89.50 | 94.25 | 88.50 | 101.00 | 101.00 |
| 321 | 33.50 | 38.00 | 48.75 | 53.50 | 54.50 | 57.50 | 54.75 | 65.00 | 65.50 |
| 330 | .... | .... | 123.25 | .... | 113.00 | 143.75 | 135.00 | 149.25 | 149.25 |
| 18-8 CbTa | 38.50 | 48.25 | 57.75 | 63.50 | 63.75 | 67.25 | 64.75 | 79.25 | 79.25 |
| 403 | .... | .... | 29.25 | .... | 33.25 | 35.00 | 30.00 | 40.25 | 40.25 |
| 405 | 20.25 | 26.50 | 30.75 | 36.00 | 34.75 | 36.50 | 32.50 | 46.75 | 46.75 |
| 410 | 17.50 | 19.50 | 29.25 | 31.00 | 33.25 | 35.00 | 30.00 | 40.25 | 40.25 |
| 416 | .... | .... | 29.75 | .... | 33.75 | 35.50 | 31.25 | 48.25 | 48.25 |
| 420 | .... | 31.50 | 35.50 | 41.75 | 40.75 | 42.75 | 40.25 | 62.00 | 62.00 |
| 430 | 17.75 | 19.75 | 29.75 | 32.00 | 33.75 | 35.50 | 31.00 | 40.75 | 40.75 |
| 430F | .... | .... | 30.50 | .... | 34.25 | 36.00 | 31.75 | 51.75 | 51.75 |
| 431 | .... | 29.75 | 39.25 | .... | 43.50 | 46.00 | 41.00 | 56.00 | 56.00 |
| 446 | .... | .... | 40.75 | 59.00 | 46.00 | 48.25 | 42.75 | 70.00 | 70.00 |

**Producers Are:** Allegheny Ludlum Steel Corp., American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

# Clad Steel

| | Plates Carbon Base 5% | 10% | 15% | 20% | Sheets Carbon Base 20% |
|---|---|---|---|---|---|
| Stainless | | | | | |
| 302 | .... | .... | .... | .... | 37.50 |
| 304 | 26.05 | 28.80 | 31.55 | 34.30 | 39.75 |
| 304L | 30.50 | 33.75 | 36.95 | 40.15 | .... |
| 316 | 38.20 | 42.20 | 46.25 | 50.25 | 58.25 |
| 316L | 42.30 | 46.75 | 51.20 | 55.65 | .... |
| 316 Cb | 49.90 | 55.15 | 60.40 | 65.65 | .... |
| 321 | 31.20 | 34.50 | 37.75 | 41.05 | 47.25 |
| 347 | 36.90 | 40.80 | 44.65 | 48.55 | 57.00 |
| 405 | 22.25 | 24.60 | 26.90 | 29.25 | .... |
| 410 | 20.55 | 22.70 | 24.85 | 27.00 | .... |
| 430 | 21.20 | 23.45 | 25.65 | 27.90 | .... |
| Inconel | 48.90 | 59.55 | 70.15 | 80.55 | .... |
| Nickel | 41.65 | 51.95 | 63.30 | 72.70 | .... |
| Nickel, Low Carbon | 41.95 | 52.60 | 63.30 | 74.15 | .... |
| Monel | 43.35 | 53.55 | 63.80 | 74.05 | .... |

| | Strip, Carbon Base —Cold Rolled— 10% | Both Sides |
|---|---|---|
| Copper* | $36.80 | $44.20 |

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

# Tool Steel

| Grade | $ per lb | Grade | $ per lb |
|---|---|---|---|
| Reg. Carbon (W-1) | 0.330 | V-Cr Hot Work (H-13) | 0.550 |
| Spec. Carbon (W-1) | 0.385 | W-Cr Hot Work (H-12) | 0.530 |
| Oil Hardening (O-1) | 0.505 | W Hot Wk. (H-21) | 1.425-1.44 |
| V-Cr Hot Work (H-11) | 0.505 | Hi-Carbon-Cr (D-11) | 0.955 |

| Grade by Analysis (%) W | Cr | V | Co | Mo | AISI Designation | $ per lb |
|---|---|---|---|---|---|---|
| 18 | 4 | 1 | .... | .... | T-1 | 1.840 |
| 18 | 4 | 2 | .... | .... | T-2 | 2.005 |
| 13.5 | 4 | 3 | .... | .... | T-3 | 2.105 |
| 18.25 | 4.25 | 1 | 4.75 | .... | T-4 | 2.545 |
| 18 | 4 | 2 | 9 | .... | T-5 | 2.915 |
| 20.25 | 4.25 | 1.6 | 12.95 | .... | T-6 | 4.330 |
| 13.75 | 3.75 | 2 | 5 | .... | T-8 | 2.485 |
| 1.5 | 4 | 1 | .... | 8.5 | M-1 | 1.200 |
| 6.4 | 4.5 | 1.9 | .... | 5 | M-2 | 1.345 |
| 6 | 4 | 3 | .... | 6 | M-3 | 1.590 |

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

# Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

| | Basic | No. 2 Foundry | Malle-able | Besse-mer |
|---|---|---|---|---|
| ***Birmingham District*** | | | | |
| Birmingham R2 | 62.00 | 62.50** | .... | .... |
| Birmingham U6 | .... | 62.50** | 66.50 | .... |
| Woodward, Ala. W15 | 62.00* | 62.50** | 66.50 | .... |
| Cincinnati, deld. | .... | 70.20 | .... | .... |
| ***Buffalo District*** | | | | |
| Buffalo H1, R2 | 66.00 | 66.50 | 67.00 | 67.50 |
| N. Tonawanda, N.Y. T9 | .... | 66.50 | 67.00 | 67.50 |
| Tonawanda, N.Y. W12 | 66.00 | 66.50 | 67.00 | 67.50 |
| Boston, deld. | 77.29 | 77.79 | 78.29 | .... |
| Rochester, N.Y., deld. | 69.02 | 69.52 | 70.02 | .... |
| Syracuse, N.Y., deld. | 70.12 | 70.62 | 71.12 | .... |
| ***Chicago District*** | | | | |
| Chicago I-3 | 66.00 | 66.50 | 66.50 | 67.00 |
| S. Chicago R2 | 66.00 | 66.50 | 66.50 | 67.00 |
| S. Chicago, Ill. W14 | 66.00 | .... | 66.50 | 67.00 |
| Milwaukee, deld. | 69.02 | 69.52 | 69.52 | 70.02 |
| Muskegon, Mich., deld. | .... | 74.52 | 74.52 | .... |
| ***Cleveland District*** | | | | |
| Cleveland R2, A7 | 66.00 | 66.50 | 66.50 | 67.00 |
| Akron, Ohio, deld. | 69.52 | 70.02 | 70.02 | 70.52 |
| ***Mid-Atlantic District*** | | | | |
| Birdsboro, Pa. B10 | 68.00 | 68.50 | 69.00 | 69.50 |
| Chester, Pa. P4 | Nom. | Nom. | Nom. | .... |
| Swedeland, Pa. A3 | 68.00 | 68.50 | 69.00 | 69.50 |
| NewYork, deld. | .... | 75.50 | 76.00 | .... |
| Newark, N.J., deld. | 72.69 | 73.19 | 73.69 | 74.19 |
| Philadelphia, deld. | 70.41 | 70.91 | 71.41 | 71.99 |
| Troy, N.Y. R2 | 68.00 | 68.50 | 69.00 | 69.50 |
| ***Pittsburgh District*** | | | | |
| NevilleIsland, Pa. P6 | 66.00 | 66.50 | 66.50 | 67.00 |
| Pittsburgh (N&S sides), Aliquippa, deld. | .... | 67.95 | 67.95 | 68.48 |
| McKeesRocks, Pa., deld. | .... | 67.60 | 67.60 | 68.13 |
| Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld. | .... | 68.26 | 68.26 | 69.79 |
| Verona, Trafford, Pa., deld. | 68.29 | 68.82 | 68.82 | 69.35 |
| Brackenridge, Pa., deld. | 68.60 | 69.10 | 69.10 | 69.63 |
| Midland, Pa. C18 | 66.00 | .... | .... | .... |
| ***Youngstown District*** | | | | |
| Hubbard, Ohio Y1 | .... | .... | 66.50 | .... |
| Sharpsville, Pa. S6 | 66.00 | .... | 66.50 | 67.00 |
| Youngstown Y1 | .... | .... | 66.50 | .... |
| Mansfield, Ohio, deld. | 71.30 | .... | 71.80 | 72.30 |
| Duluth I-3 | 66.00 | 66.50 | 66.50 | 67.00 |
| Erie, Pa. I-3 | 66.00 | 66.50 | 66.50 | 67.00 |
| Everett, Mass. E1 | 67.50 | 68.00 | 68.50 | .... |
| Fontana, Calif. K1 | 75.00 | 75.50 | .... | .... |
| Geneva, Utah C11 | 66.00 | 66.50 | .... | .... |
| GraniteCity, Ill. G4 | 67.90 | 68.40 | 68.90 | .... |
| Ironton, Utah C11 | 66.00 | 66.50 | .... | .... |
| Minnequa, Colo. C10 | 68.00 | 68.50 | 69.00 | .... |
| Rockwood, Tenn. T3 | .... | 62.50‡ | 66.50 | .... |
| Toledo, Ohio I-3 | 66.00 | 66.50 | 66.50 | 67.00 |
| Cincinnati, deld. | 72.94 | 73.44 | .... | .... |

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

## PIG IRON DIFFERENTIALS

*Silicon:* Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

*Manganese:* Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

## BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% Silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

| | |
|---|---|
| Jackson, Ohio I-3, J1 | $78.00 |
| Buffalo H1 | 79.25 |

## ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

| | |
|---|---|
| CalvertCity, Ky. P15 | $99.00 |
| NiagaraFalls, N.Y. P15 | 99.00 |
| Keokuk, Iowa Open-hearth & Fdry. K2 | 89.00 |
| Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2 | 92.00 |

## LOW PHOSPHORUS PIG IRON, Gross Ton

| | |
|---|---|
| Birdsboro, Pa. B10 (Phos. 0.035% max) | $73.00 |
| Lyles, Tenn. T3 (Phos. 0.035% max) | 73.00 |
| Rockwood, Tenn. T3 (Phos. 0.035% max) | 73.00 |
| Buffalo H1 (Intermediate) (0.036-0.075% max) | 71.50 |
| Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max) | 71.00 |
| Duluth I-3 (Intermediate) (Phos. 0.036-0.075%) | 71.00 |
| Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max) | 71.00 |
| NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max) | 71.00 |
| Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max) | 73.00 |
| Troy, N.Y. R2 (Phos. 0.075% max) | 73.00 |

# Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

| | SHEETS | | | | STRIP | BARS | | | STRUCTURAL | PLATES | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot Rolled | Cold Rolled | Galv. | Stainless Type 302 | Hot Rolled | H.R. Rounds | C.F. Rounds | H.R. Alloy 4140 | SHAPES | Carbon | Floor |
| Baltimore | 8.53 | 10.00 | 10.06 | .... | 10.94 | 9.33 | 11.80 | 16.38 | 9.92 | 9.15 | 10.50 |
| Birmingham | 9.43 | 10.20 | 10.46 | .... | 10.41 | 9.09 | 13.14 | 16.76 | 9.00 | 9.29 | 10.90 |
| Boston | 9.63 | 10.40 | 11.77 | 53.50 | 11.60 | 9.91 | 13.35 | 16.59 | 10.52 | 9.71 | 11.28 |
| Buffalo | 8.80 | 9.95 | 11.15 | 55.98 | 10.65 | 9.00 | 11.45 | 16.30 | 9.65 | 9.00 | 10.85 |
| Charlotte, N. C. | 10.81 | 11.22 | 11.34 | .... | 12.29 | 10.97 | 12.68 | .... | 11.38 | 11.17 | 12.18 |
| Chicago | 8.74 | 10.20 | 10.95 | 53.00 | 10.40 | 8.84 | 10.65 | 15.95 | 9.33 | 8.67 | 10.46 |
| Cincinnati | 8.91 | 10.26 | 11.00 | 53.43 | 10.72 | 9.16 | 11.53 | 16.27 | 9.89 | 9.05 | 10.79 |
| Cleveland | 8.73 | 9.88 | 11.14 | 52.33 | 10.51 | 8.96 | 11.25 | 16.06 | 9.75 | 8.92 | 10.56 |
| Dallas | 10.07 | 10.81 | 12.59 | .... | 11.68 | 9.53 | 12.98 | 16.95 | 9.74 | 9.87 | 11.52 |
| Detroit | 9.00 | 10.46 | 11.30 | 56.50 | 10.77 | 9.15 | 11.01 | 16.23 | 9.89 | 9.04 | 10.72 |
| Houston | 9.67 | 10.41 | 12.19 | 52.00 | 11.28 | 9.13 | 13.10 | 16.55 | 9.34 | 9.47 | 11.12 |
| Indianapolis | 9.18 | 10.64 | 11.39 | .... | 10.84 | 9.28 | 11.09 | 16.39 | 9.77 | 9.11 | 10.90 |
| Kansas City | 9.21 | 10.87 | 11.35 | .... | 10.87 | 9.31 | 11.57 | 15.72 | 9.80 | 9.10 | .... |
| Los Angeles | 9.95 | 11.55 | 12.20 | 57.60 | 11.55 | 9.75 | 14.20 | 17.35 | 10.00 | 10.00 | 11.85 |
| Milwaukee | 9.88 | 10.34 | 11.09 | .... | 10.54 | 8.98 | 10.89 | 16.09 | 9.55 | 8.81 | 10.60 |
| New York | 9.36 | 10.13 | 11.35 | 53.08 | 11.46 | 9.74 | 13.25 | 16.40 | 10.20 | 9.51 | 11.05 |
| Philadelphia | 9.10 | 10.00 | 10.89 | 52.17 | 11.10 | 9.50 | 11.95 | 16.38 | 9.85 | 9.55 | 10.55 |
| Pittsburgh | 8.73 | 9.88 | 11.03 | 52.33 | 10.49 | 8.85 | 11.25 | 15.95 | 9.36 | 8.68 | 10.32 |
| St. Louis | 8.54 | 10.58 | 11.33 | .... | 10.50 | 8.95 | 11.28 | 16.33 | 9.45 | 8.78 | 10.57 |
| St. Paul | 9.00 | 9.59 | 10.74 | .... | 10.66 | 9.12 | 11.49 | 16.54 | 9.63 | 8.95 | 10.49 |
| San Francisco | 10.90 | 11.55 | 11.55 | 55.10 | 12.15 | 10.65 | 15.10 | 17.25 | 10.85 | 10.90 | 12.90 |
| Seattle | 11.55 | 12.30 | 12.50 | 56.52 | 12.65 | 11.10 | 16.20 | 17.80 | 11.20 | 11.00 | 13.10 |
| Spokane, Wash. | 11.55 | 12.30 | 12.50 | 57.38 | 13.15 | 11.60 | 16.20 | 17.80 | 11.20 | 11.00 | 13.60 |

Specifications: Hot rolled sheet, sheared edge, 10 Ga. x 36 x 96-120 in.; cold rolled sheets, 20 Ga. x 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, ¾ in.—2½ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, ¼ in. x 84 in.; floor plates, ¼ in. x 36 in.

# Refractories

**Fire Clay Brick (per 1000 pieces*)**

*High-Heat Duty:* Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

*Super-Duty:* Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

**Silica Brick (per 1000 pieces*)**

*Standard:* Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

*Super-Duty:* Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

**Semisilica Brick (per 1000 pieces*)**

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

**Ladle Brick (per 1000 pieces*)**

*Dry Pressed:* Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

**High-Alumina Brick (per 1000 pieces*)**

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

**Sleeves (per 1000)**

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

**Nozzles (per 1000)**

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

**Runners (per 1000)**

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

**Dolomite (per net ton)**

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

**Magnesite (per net ton)**

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ¾ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

# Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective $CaF_2$ content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

# Ores

**Lake Superior Iron Ore**

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

| | |
|---|---|
| Mesabi bessemer | $11.60 |
| Mesabi nonbessemer | 11.45 |
| Old Range bessemer | 11.85 |
| Old Range nonbessemer | 11.70 |
| Open-hearth lump | 12.70 |
| High phos. | 11.45 |

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

**Eastern Local Iron Ore**

Cents per unit, delid. E. Pa.

| | |
|---|---|
| New Jersey, concentrates | nom. |

**Foreign Iron Ore**

Cents per unit, c.i.f. Atlantic ports

| | |
|---|---|
| Swedish basic, 65% | 21.00† |
| Brazilian iron ore, 68.5% | 21.00 |

**Tungsten Ore**

Net ton, unit

| | |
|---|---|
| Foreign wolframite, good commercial quality | $19.00-19.50 |
| Domestic, concentrates, f.o.b. milling points | 22.00-23.00 |

*Before duty. †Nominal.

**Manganese Ore**

Mn 46-48%, Indian, 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

**Chrome Ore**

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

*Indian and Rhodesian*

| | |
|---|---|
| 48% 3:1 | $34.00-35.00† |
| 48% no ratio | 25.00-26.00† |

*South African Transvaal*

| | |
|---|---|
| 44% no ratio | 18.00† |
| 48% no ratio | 24.00-26.00† |

*Turkish*

| | |
|---|---|
| 48% 3:1 | 36.00-37.00† |

*Domestic*

Rail nearest seller

| | |
|---|---|
| 18% 3:1 | 30.00 |

**Molybdenum**

| | |
|---|---|
| Sulfide concentrate, per lb of Mo content, mines, unpacked | $1.23 |

**Antimony Ore**

Per short ton unit of Sb content, c.i.f. seaboard

| | |
|---|---|
| 50-55% | $2.50-2.75 |
| 60-65% | 2.80-3.20 |

**Vanadium Ore**

Cents per lb $V_2O_5$

| | |
|---|---|
| Domestic | 31.00 |

†Nominal.

# Electrodes

Threaded with nipple; unboxed, f.o.b. plant

**GRAPHITE**

| Inches Diam | Inches Length | Per 100 lb |
|---|---|---|
| 2 | 24 | $64.00 |
| 2½ | 30 | 41.50 |
| 3 | 40 | 39.25 |
| 4 | 40 | 37.00 |
| 5½ | 40 | 36.50 |
| 6 | 60 | 33.25 |
| 7 | 60 | 29.75 |
| 8, 9, 10 | 60 | 29.50 |
| 12 | 72 | 28.25 |
| 14 | 60 | 28.25 |
| 16 | 72 | 27.25 |
| 17 | 60 | 27.25 |
| 18 | 72 | 27.00 |
| 20 | 72 | 26.50 |
| 24 | 84 | 27.25 |

**CARBON**

| | | |
|---|---|---|
| 8 | 60 | 14.25 |
| 10 | 60 | 13.80 |
| 12 | 60 | 14.75 |
| 14 | 60 | 14.75 |
| 14 | 72 | 12.55 |
| 17 | 60 | 12.65 |
| 17 | 72 | 12.10 |
| 20 | 90 | 11.55 |
| 24 | 72, 84 | 11.95 |
| 24 | 96 | 12.10 |
| 30 | 84 | 12.00 |
| 35, 40 | 110 | 11.60 |
| 40 | 100 | 12.50 |

# Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

| | Cents |
|---|---|
| Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River: | |
| 100 mesh, bags | 11.50 |
| 100 mesh, pails | 9.85‡ |
| 40 mesh, bags | 8.10†† |
| Electrolytic Iron, | |
| Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in. | 28.75 |
| (In contract lots of 240 tons price is 22.75c) | |
| Annealed, 99.5% Fe | 36.75 |
| Unannealed (99+ % Fe) | 33.25 |
| Unannealed (99+ % Fe) (minus 325 mesh) | 58.25 |
| Powder Flake (minus 16 plus 100 mesh) | 29.25 |
| Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh. | |
| Aluminum: Atomized, 500-lb drum freight allowed, c.l. 38.50; ton lots 40.50 | |
| Antimony, 500-lb lots | 42.00* |
| Brass, 5000-lb lots | 35.10-52.20† |
| Bronze, 5000-lb lots | 53.10-56.70† |
| Copper, electrolytic | 14.25* |
| Copper, reduced | 14.25* |
| Lead | 7.50* |
| Manganese, Electrolytic: Minus 35 mesh | $1.00 |
| Nickel | $1.15 |
| Nickel-Silver, 5000-lb lots | 60.70-69.00† |
| Phosphor-Copper, 5000-lb lots | 66.00 |
| Copper (atomized) 5000-lb lots | 46.50-64.50 |
| Solder | 7.00* |
| Silicon | 70.00* |
| Stainless Steel, 304 | 89.00* |
| Stainless Steel, 316 | $1.07 |
| Tin | 14.00* |
| Zinc, 5000-lb lots | 21.20-34.40† |
| Tungsten: | Dollars |
| Carbon reduced, 98.8% min., minus 65 mesh | nom.** |
| Chromium electrolytic 99.8% Cr. min., metallic basis | 5.00 |

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

# Metallurgical Coke

Price per net ton

**Beehive Ovens**

| | |
|---|---|
| Connellsville, Pa., furnace | $14.75-15.25 |
| Connellsville, Pa., foundry | 18.00-18.50 |

**Oven Foundry Coke**

| | |
|---|---|
| Birmingham, ovens | $30.35 |
| Cincinnati, delid. | 33.34 |
| Buffalo, ovens | 32.00 |
| Detroit, ovens | 32.00 |
| Pontiac, Mich., delid. | 33.95 |
| Saginaw, Mich., delid. | 35.53 |
| Erie, Pa., ovens | 32.00 |
| Everett, Mass., ovens: | |
| New England, delid. | 33.55* |
| Indianapolis, ovens | 31.25 |
| Ironton, Ohio, ovens | 30.50 |
| Cincinnati, delid. | 33.54 |
| Kearny, N. J., ovens | 31.25 |
| Milwaukee, ovens | 32.00 |
| Neville Island (Pittsburgh), Pa., ovens | 30.75 |
| Painesville, Ohio, ovens | 32.00 |
| Cleveland, delid. | 34.19 |
| Philadelphia, ovens | 31.00 |
| St. Louis, ovens | 33.00 |
| St. Paul, ovens | 31.25 |
| Chicago, delid. | 34.68 |
| Swedeland, Pa., ovens | 31.00 |
| Terre Haute, Ind., ovens | 31.25 |

*Within $5.15 freight zone from works.

# Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

| | North Atlantic | Great Lakes | South Atlantic | Gulf Coast | West Coast |
|---|---|---|---|---|---|
| Deformed Bars, Intermediate, ASTM-A 305 | $5.95 | $6.00 | $5.85 | $5.70 | $6.10 |
| Bar Size Angles | 5.95 | 6.00 | 5.85 | 5.75 | 6.10 |
| Structural Angles | 5.86 | 5.91 | 5.76 | 5.66 | 6.01 |
| I-Beams | 5.86 | 5.91 | 5.76 | 5.66 | 6.01 |
| Channels | 5.86 | 5.91 | 5.76 | 5.66 | 6.01 |
| Plates (basic bessemer) | 5.98 | 6.03 | 5.88 | 5.78 | 6.13 |
| Sheets, H.R. | 7.50 | 7.55 | 7.40 | 7.30 | 7.65 |
| Sheets, Galvanized, 20 Ga., 36 in. x 96 in. | 9.70 | 9.75 | 9.60 | 9.50 | 9.85 |
| *Sheets, Galv. (in coils) 20 Ga., 48 in. wide* | *9.60* | *9.65* | *9.50* | *9.40* | *9.75* |
| Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft | 25.08 | 24.20 | 24.42 | 24.15 | 25.47 |
| Barbed Wire (†) | 6.50 | 6.55 | 6.40 | 6.30 | 6.65 |
| Merchant Bars | 6.39 | 6.44 | 6.29 | 6.19 | 6.54 |
| Hot-Rolled Bands | 7.90 | 7.95 | 7.80 | 7.70 | 8.05 |
| Wire Rods, Thomas Commercial No. 5 | 6.60 | .... | 6.45 | 6.45 | 6.70 |
| Wire Rods, O. H. | 7.05 | .... | 6.90 | 6.90 | 7.15 |
| *Bright Common Wire Nails (§)* | *7.80* | *7.85* | *7.50* | *7.60* | *7.95* |

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

# Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

| | |
|---|---|
| Pure benzene | 31.00 |
| Xylene, industrial grade | 29.00 |
| Creosote | 24.00 |
| Naphthalene, 78 deg. | 5.00 |
| Toluene, one deg. (delid. east of Rockies) | 25.00 |

Cents per lb, f.o.b. tank cars or tank trucks, delid.

| | |
|---|---|
| Phenol, 90 per cent grade | 14.75 |

Per net ton bulk, f.o.b. cars or trucks, plant.

| | |
|---|---|
| Ammonium sulfate, regular grade | $32.00 |

An important message for the man who buys

# STEEL WIRE RODS

Any manufacturer of nail, wire mesh or barbed wire looks first for quality in steel wire rods. For rods that are uniform in size and of the specified tensile strength, mill owners have learned to rely on Sumitomo's wire rods, made in accordance with strictest standards. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

*LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS*

**SUMITOMO METAL INDUSTRIES, LTD.**

HEAD OFFICE: OSAKA, JAPAN
CABLE ADDRESS: "SUMITOMOMETAL OSAKA"

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**If**

**METALWORKING PLANTS ARE YOUR PROSPECTS...**

✔ **STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, O.**

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**DEMING "MOTOR-MOUNT" CENTRIFUGAL PUMPS**

STAINLESS STEEL SHAFT SLEEVE protects pump shaft and insures longer life

Pumps range from 1½" to 5" discharge...capacities to 1200 gallons per minute with 1-40 H. P. motors. Write for Bulletin No. 4200-A.

*Just one of the many Deming pump features that provide longer life and lower operating costs*

**The DEMING Co.**

351 BROADWAY • SALEM, OHIO

AMERICAN ORIGINALS IN IRON AND STEEL

# The chain that stopped the British Navy

During the War for Independence, the iron industry expanded greatly because of the increased demand for cannons, cannon balls and other war materials. However, one of the most interesting and outstanding contributions towards the cause was a chain that stopped the British Navy from going up the Hudson River beyond the Fort at West Point.

In 1778, the Sterling Works, some 25 miles southwest of West Point, operated all their forges day and night to make a massive chain 1500 feet long. Each link was 2 feet long and weighed 100 pounds. This chain was carried to West Point, floated on logs and stretched across the Hudson, where it made a formidable barrier no British gun boat dared to cross.

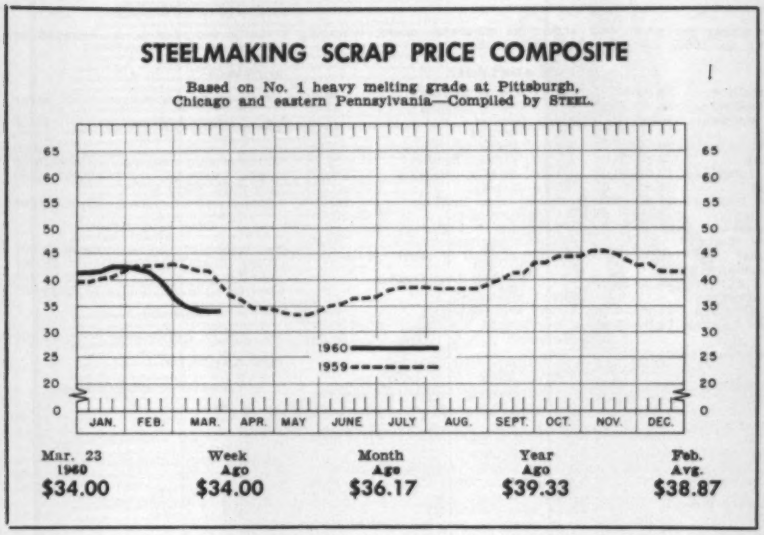
History is filled with many such important contributions made by the iron and steel industry. We at The J. E. Baker Company are proud of the fact that, since 1889, this vital industry has relied on Baker's Magdolite and Jebcolite, the original dead-burned dolomites, for more uniform ingots, greater furnace efficiency and lower refractory costs. Magdolite and Jebcolite offer many advantages . . . in superior composition, preparation, strength, economy and quality.

ANOTHER AMERICAN ORIGINAL JEBCO PRODUCTS SINCE 1889 BAKER'S MAGDOLITE

The original dead-burned dolomite

**THE J. E. BAKER COMPANY**

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO




# Scrap Price Drop Appears Halted

**STEEL's composite on No. 1 heavy melting grade holding unchanged at $34, after declining seven straight weeks. Mill buying slow with ingot rate slipping**

Scrap Prices, Page 132

• **Pittsburgh** — Prices are unchanged. Cast iron and stainless scrap are weakening as buyers display no interest. Although there's little activity, sellers think several factors point to moderate improvement: 1. District mills are pressing for previously ordered scrap, apparently because inventories are getting low. 2. Heavy snows and low prices have cut the flow of scrap into dealers' yards. 3. This month's automotive lists will be smaller, encouraging higher bidding.

• **Philadelphia** — While prices on the heavy melting grades and bundles are unchanged, quotations on No. 1 bundles and No. 1 bushelling have declined $1 a ton to $37, delivered, and electric furnace bundles $1 a ton to $38. Were it not for some improvement in foreign buying, the major melting grades would be off substantially, as there's little domestic demand.

Trading in borings and turnings is virtually at a standstill, with prices off nominally on mixed borings and turnings to $20 delivered; on shoveling turnings to $23; and on machine shop turnings to $20. Prices on heavy turnings are nominal and unchanged. Rail crops have dropped $2 to $58-$60, and malleable is off $3 to $60, nominal.

• **New York**—Brokers have reduced buying prices on shoveling turnings $1 a ton to $12-$13, while 18-8 stainless sheets, clips, and solids are off $5 to $195-$200.

• **Chicago**—A few scattered purchases of scrap suggest that the price level has bottomed out, but acquisitions are so limited that no real test of the market is provided. A mill bought No. 2 bundles for $20, the price that has been generally quoted. This was but a reaffirmation of the market. It was also reported that a broker paid $36 for No. 1 railroad heavy melting on track.

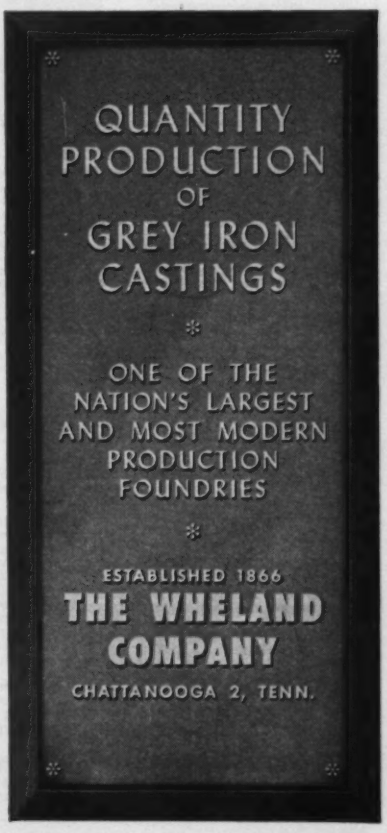
• **Cleveland**—Slackening steelmaking operations are discouraging hopes of an early pickup in mill buying. Prices, holding at the recently established lower levels, are largely nominal. The Valley ingot rate last week fell 7 points to 79 per cent of capacity as Youngstown Sheet & Tube and Republic Steel took off two open hearths each. Republic also cut its bessemer production. Sharon Steel reported a small decline. The Cleveland ingot rate advanced 2 points to 102 per cent.

• **Detroit**—The market appears to have leveled off for the present, but brokers still anticipate sizable tonnages on monthend auto lists which may send prices down further. Lack of mill activity is definitely putting a damper on the market. There are only scattered, small spot orders out. Prices are steady.

• **Buffalo**—A decline of $2 a ton in the price of cupola scrap features the market here. A leading consumer bought a modest tonnage of that grade at $46. It had been quoted at $48. Steel scrap prices are marking time.

• **Cincinnati**—The market is quiet and without feature. Trading is at a standstill, but brokers and dealers think the price decline has hit bottom. Brokers are quoting $31.50-$32.50 on No. 1 heavy melting steel.

(*Please turn to Page* 137)



# Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Mar. 23, 1960. *Changes shown in italics.*

## STEELMAKING SCRAP COMPOSITE

| | |
|---|---|
| Mar. 23 | $34.00 |
| Mar. 16 | 34.00 |
| Feb. Avg. | 38.87 |
| Mar. 1959 | 40.40 |
| Mar. 1955 | 37.50 |

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

### PITTSBURGH

| | |
|---|---|
| No. 1 heavy melting | 34.00-35.00 |
| No. 2 heavy melting | 28.00-29.00 |
| No. 1 dealer bundles | 36.00-37.00 |
| No. 2 bundles | 24.00-25.00 |
| No. 1 busheling | 34.00-35.00 |
| No. 1 factory bundles | 43.00-44.00 |
| Machine shop turnings | 17.00-18.00 |
| Mixed borings, turnings | 17.00-18.00 |
| Short turnings | 24.00-25.00 |
| Cast iron borings | 24.00-25.00 |
| Cut structurals: | |
| 2 ft and under | 42.00-43.00 |
| 3 ft and under | 41.00-42.00 |
| Heavy turnings | 31.00-32.00 |
| Punchings & plate scrap | 46.00-47.00 |
| Electric furnace bundles | 44.00-45.00 |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *44.00-45.00* |
| Stove plate | 46.00-47.00 |
| Unstripped motor blocks | 32.00-33.00 |
| Clean auto cast | 47.00-48.00 |
| *Drop broken machinery* | *51.00-52.00* |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 37.00-38.00 |
| Rails, 2 ft and under | 58.00-59.00 |
| Rails, 18 in. and under | 59.00-60.00 |
| Random rails | 53.00-54.00 |
| Angles, splice bars | 47.00-48.00 |
| Railroad specialties | 44.00-45.00 |
| Rails, rerolling | 64.00-65.00 |

Stainless Steel Scrap

| | |
|---|---|
| *18-8 bundles & solids* | *220.00-225.00* |
| 18-8 turnings | 120.00-125.00 |
| *430 bundles & solids* | *120.00-125.00* |
| 430 turnings | 55.00-65.00 |

### CHICAGO

| | |
|---|---|
| No. 1 hvy melt., indus. | 32.00-33.00 |
| No. 1 hvy melt., dealer | 30.00-31.00 |
| *No. 2 hvy melting* | *27.00-28.00* |
| *No. 1 factory bundles* | *33.00-36.00* |
| No. 1 dealer bundles | 31.00-32.00 |
| No. 2 bundles | 19.00-20.00 |
| No. 1 busheling, indus. | 32.00-33.00 |
| No. 1 busheling, dealer | 30.00-31.00 |
| Machine shop turnings | 15.00-16.00 |
| Mixed borings, turnings | 17.00-18.00 |
| Shovel turnings | 17.00-18.00 |
| Cast iron borings | 17.00-18.00 |
| Cut structurals, 3 ft | 38.00-39.00 |
| Punchings & plate scrap | 40.00-41.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 45.00-46.00 |
| Stove plate | 42.00-43.00 |
| Unstripped motor blocks | 39.00-40.00 |
| Clean auto cast | 53.00-54.00 |
| Drop broken machinery | 53.00-54.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 33.00-34.00 |
| R.R. malleable | 55.00-56.00 |
| Rails, 2 ft and under | 52.00-53.00 |
| Rails, 18 in. and under | 53.00-54.00 |
| Angles, splice bars | 45.00-46.00 |
| Axles | 51.00-52.00 |
| Rails, rerolling | 53.00-54.00 |

Stainless Steel Scrap

| | |
|---|---|
| 18-8 bundles, solids | 210.00-215.00 |
| 18-8 turnings | 110.00-115.00 |
| 430 bundles & solids | 115.00-120.00 |
| 430 turnings | 55.00-60.00 |

### DETROIT

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 28.00-29.00 |
| No. 2 heavy melting | 17.00-18.00 |
| No. 1 bundles | 31.00-32.00 |
| No. 2 bundles | 15.00-16.00 |
| No. 1 busheling | 28.00-29.00 |
| Machine shop turnings | 12.00-13.00 |
| Mixed borings, turnings | 11.00-12.00 |
| Shovel turnings | 10.00-11.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 40.00-41.00 |
| Stove plate | 34.00-35.00 |
| Heavy breakable | 34.00-35.00 |
| Unstripped motor blocks | 26.00-27.00 |
| Charging box cast | 34.00-35.00 |
| Clean auto cast | 47.00-48.00 |

### CLEVELAND

| | |
|---|---|
| No. 1 heavy melting | 33.00-34.00 |
| No. 2 heavy melting | 24.00-25.00 |
| No. 1 factory bundles | 40.00-41.00 |
| No. 1 bundles | 33.00-34.00 |
| No. 2 bundles | 20.00-21.00 |
| No. 1 busheling | 33.00-34.00 |
| Machine shop turnings | 12.00-13.00 |
| Shovel turnings | 16.00-17.00 |
| Mixed borings, turnings | 16.00-17.00 |
| Cast iron borings | 16.00-17.00 |
| Cut foundry steel | 35.00-36.00 |
| Cut structurals, plate 2 ft and under | 43.00-44.00 |
| Low phos. punchings & plate | 34.00-35.00 |
| Alloy free, short shovel turnings | 17.00-18.00 |
| Electric furnace bundles | 34.00-35.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 49.00-50.00† |
| Charging box cast | 33.00-34.00† |
| Heavy breakable cast | 35.00-36.00† |
| Stove plate | 44.00-45.00† |
| Unstripped motor blocks | 37.00-38.00 |
| Brake shoes | 35.00-36.00† |
| Clean auto cast | 52.00-53.00† |
| Burnt cast | 42.00-43.00† |
| Drop broken machinery | 54.00-55.00 |

Railroad Scrap

| | |
|---|---|
| R.R. malleable | 52.00-53.00 |
| Rails, 2 ft and under | 56.00-57.00 |
| Rails, 18 in. and under | 57.00-58.00 |
| Rails, random lengths | 49.00-50.00 |
| Cast steel | 42.00-43.00 |
| No. 1 railroad cast | 52.00-53.00 |
| Railroad specialties | 45.00-46.00 |
| Angles, splice bars | 45.00-46.00 |
| Rails, rerolling | 60.00-61.00 |

Stainless Steel (Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| 18-8 bundles, solids | 205.00-210.00† |
| 18-8 turnings | 105.00-110.00† |
| 430 clips, bundles, solids | 110.00-115.00† |
| 430 turnings | 35.00-45.00† |

### YOUNGSTOWN

| | |
|---|---|
| No. 1 heavy melting | 36.00-37.00 |
| No. 2 heavy melting | 27.00-28.00† |
| No. 1 busheling | 36.00-37.00 |
| No. 1 bundles | 36.00-37.00 |
| No. 2 bundles | 23.00-24.00 |
| Machine shop turnings | 15.00-16.00 |
| Shovel turnings | 20.00-21.00 |
| Cast iron borings | 20.00-21.00 |
| Low phos. | 37.00-38.00 |
| Electric furnace bundles | 37.00-38.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 37.00-38.00 |

### BUFFALO

| | |
|---|---|
| No. 1 heavy melting | 31.00-32.00 |
| No. 2 heavy melting | 27.00-28.00 |
| No. 1 bundles | 31.00-32.00 |
| No. 2 bundles | 23.00-24.00 |
| No. 1 busheling | 31.00-32.00 |
| Shovel turnings | 21.00-22.00 |
| Machine shop turnings | 17.00-18.00 |
| Cast iron borings | 19.00-20.00 |
| Low phos. structurals and plate, 2 ft and under | 41.00-42.00 |

Cast Iron Grades (F.o.b. shipping point)

| | |
|---|---|
| *No. 1 cupola* | *45.00-46.00* |
| No. 1 machinery | 49.00-50.00 |

Railroad Scrap

| | |
|---|---|
| Rails, random lengths | 44.00-45.00 |
| Rails, 3 ft and under | 50.00-51.00 |
| Railroad specialties | 41.00-42.00 |

### CINCINNATI

(Broker's buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 31.50-32.50 |
| No. 2 heavy melting | 26.00-27.00 |
| No. 1 bundles | 31.50-32.50 |
| No. 2 bundles | 21.00-22.00 |
| No. 1 busheling | 31.50-32.50 |
| Machine shop turnings | 15.00-16.00 |
| Mixed borings, turnings | 15.00-16.00 |
| Shovel turnings | 18.00-19.00 |
| Cast iron borings | 18.00-19.00 |
| Low phos. 18 in. | 44.00-45.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 43.00-44.00 |
| Heavy breakable cast | 37.00-38.00 |
| Charging box cast | 39.00-40.00 |
| Drop broken machinery | 54.00-55.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 37.00-38.00 |
| Rails, 18 in. and under | 55.00-56.00 |
| Rails, random lengths | 48.00-49.00 |

### PHILADELPHIA

| | |
|---|---|
| No. 1 heavy melting | 36.00 |
| No. 2 heavy melting | 32.00 |
| *No. 1 bundles* | *37.00* |
| No. 2 bundles | 23.00 |
| *No. 1 busheling* | *37.00* |
| *Electric furnace bundles* | *38.00* |
| *Mixed borings, turnings* | *20.00†* |
| *Shovel turnings* | *23.00†* |
| *Machine shop turnings* | *20.00†* |
| Heavy turnings | 29.00-30.00† |
| Structurals & plates | 39.00-40.00 |
| Couplers, springs, wheels | 45.00 |
| *Rail crops, 2 ft & under* | *58.00-60.00* |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 42.00 |
| Heavy breakable cast | 43.00 |
| Drop broken machinery | 51.00-52.00 |
| *Malleable* | *60.00†* |

### NEW YORK

(Brokers' buying prices)

| | |
|---|---|
| No. 1 heavy melting | 31.00-32.00 |
| No. 2 heavy melting | 21.00-22.00 |
| No. 1 bundles | 31.00-32.00 |
| No. 2 bundles | 16.00-17.00 |
| Machine shop turnings | 8.00-9.00† |
| Mixed borings, turnings | 9.00-10.00 |
| *Shovel turnings* | *12.00-13.00†* |
| Low phos. structurals & plates | 38.00-39.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 37.00-38.00 |
| Unstripped motor blocks | 25.00-26.00 |
| Heavy breakable | 34.00-35.00 |

Stainless Steel

| | |
|---|---|
| *18-8 sheets, clips, solids* | *195.00-200.00* |
| 18-8 borings, turnings | 90.00-95.00 |
| 410 sheets, clips, solids | 55.00-60.00 |
| 430 sheets, clips, solids | 80.00-85.00 |

### BOSTON

(Brokers' buying prices; f.o.b. shipping point)

| | |
|---|---|
| No. 1 heavy melting | 27.00-28.00 |
| No. 2 heavy melting | 23.00-24.00 |
| No. 1 bundles | 27.00-28.00 |
| No. 1 busheling | 27.00-28.00 |
| Machine shop turnings | 6.00-7.00 |
| Shovel turnings | 11.00-12.00 |
| No. 1 cast | 39.00-40.00 |
| Mixed cupola cast | 33.00-34.00 |
| No. 1 machinery cast | 40.00-42.00 |

### BIRMINGHAM

| | |
|---|---|
| No. - heavy melting | 31.00-32.00 |
| No. 2 heavy melting | 26.00-27.00 |
| No. 1 bundles | 31.00-32.00 |
| No. 2 bundles | 21.00-22.00 |
| No. 1 busheling | 37.00-38.00 |
| Cast iron borings | 12.00-13.00 |
| Machine shop turnings | 21.00-22.00 |
| Shovel turnings | 22.00-23.00 |
| Bar crops and plate | 41.00-42.00 |
| Structurals & plate | 40.00-41.00 |
| Electric furnace bundles | 37.00-38.00 |
| Electric furnace: | |
| 3 ft and under | 36.00-37.00 |
| 2 ft and under | 35.00-36.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 49.00-50.00 |
| Stove plate | 49.00-50.00 |
| Charging box cast | 29.00-30.00 |
| Unstripped motor blocks | 38.00-39.00 |
| *No. 1 wheels* | *38.00-39.00* |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 33.00-34.00 |
| *Rails, 18 in. and under* | *50.00-51.00* |
| *Rails, rerolling* | *51.00-52.00* |
| *Rails, random lengths* | *45.00-46.00* |
| *Angles, splice bars* | *42.00-43.00* |

### ST. LOUIS

(Brokers' buying prices)

| | |
|---|---|
| No. 1 heavy melting | 34.00 |
| No. 2 heavy melting | 32.00 |
| No. 1 bundles | 36.00 |
| No. 2 bundles | 22.00 |
| No. 1 busheling | 36.00 |
| Machine shop turnings | 15.50 |
| Shovel turnings | 17.50 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 48.00 |
| Charging box cast | 41.00† |
| Heavy breakable cast | 41.00† |
| Unstripped motor blocks | 41.00† |
| Clean auto cast | 51.00 |
| Stove plate | 42.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 38.00 |
| Rails, 18 in. and under | 50.00† |
| Rails, random lengths | 45.00 |
| Rails, rerolling | 56.00† |
| Angles, splice bars | 45.00† |

### HOUSTON

(Brokers' buying prices; f.o.b. cars)

| | |
|---|---|
| No. 1 heavy melting | 34.00 |
| No. 2 heavy melting | 31.00 |
| No. 2 bundles | 19.00 |
| Machine shop turnings | 15.00-16.00 |
| Shovel turnings | 19.00-20.00 |
| Low phos. plate & structurals | 41.00-42.00† |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 39.00-40.00† |
| Heavy breakable | 29.00† |
| Foundry malleable | 36.00-37.00† |
| Unstripped motor blocks | 33.00-33.50† |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 34.00† |

### LOS ANGELES

(Brokers' buying prices)

| | |
|---|---|
| No. 1 heavy melting | 34.00 |
| No. 2 heavy melting | 31.00 |
| No. 1 bundles | 33.00 |
| No. 2 bundles | 17.00-18.00 |
| Machine shop turnings | 16.00 |
| Shovel turnings | 15.00 |
| Cast iron borings | 15.00 |
| Cut structurals and plate 1 ft and under | 45.00 |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *43.00* |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. heavy melt. | 39.00 |

### PORTLAND, OREG.

| | |
|---|---|
| *No. 1 heavy melting* | *35.00* |
| *No. 2 heavy melting* | *32.00* |
| *No. 1 bundles* | *32.00* |
| *No. 2 bundles* | *25.00* |
| *Shovel turnings* | *20.00* |
| *Electric furnace bundles* | *42.00-43.00* |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *34.00* |
| *Heavy breakable* | *33.00* |
| *Unstripped motor blocks* | *28.00* |
| *Stove plate* | *22.00* |

### SEATTLE

(Prepared, f.o.b. car)

| | |
|---|---|
| *No. 1 heavy melting* | *35.00* |
| *No. 2 heavy melting* | *32.00* |
| *No. 1 bundles* | *25.00* |
| *No. 2 bundles* | *22.00* |
| Machine shop turnings | 17.00† |
| Mixed borings, turnings | 17.00† |
| Electric furnace No. 1 | 45.00 |

Cast Iron Grades

| | |
|---|---|
| *No. 1 cupola* | *32.00* |
| Heavy breakable cast | 30.00 |
| Unstripped motor blocks | 25.00 |
| Stove plate (f.o.b. plant) | 21.00† |

### SAN FRANCISCO

| | |
|---|---|
| No. 1 heavy melting | 35.00 |
| No. 2 heavy melting | 31.00 |
| No. 1 bundles | 31.00 |
| No. 2 bundles | 20.00 |
| Machine shop turnings | 14.00 |
| Mixed borings, turnings | 14.00 |
| Cast iron borings | 14.00 |
| Heavy turnings | 14.00 |
| Shovel turnings | 14.00 |
| Cut structurals, 3 ft | 40.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 cupola | 46.00 |
| Charging box cast | 34.00 |
| Stove plate | 34.00 |
| Heavy breakable cast | 28.00 |
| Unstripped motor blocks | 31.00 |
| Clean auto cast | 40.00 |
| Drop broken machinery | 40.00 |
| No. 1 wheels | 34.00 |

### HAMILTON, ONT.

(Brokers' buying prices)

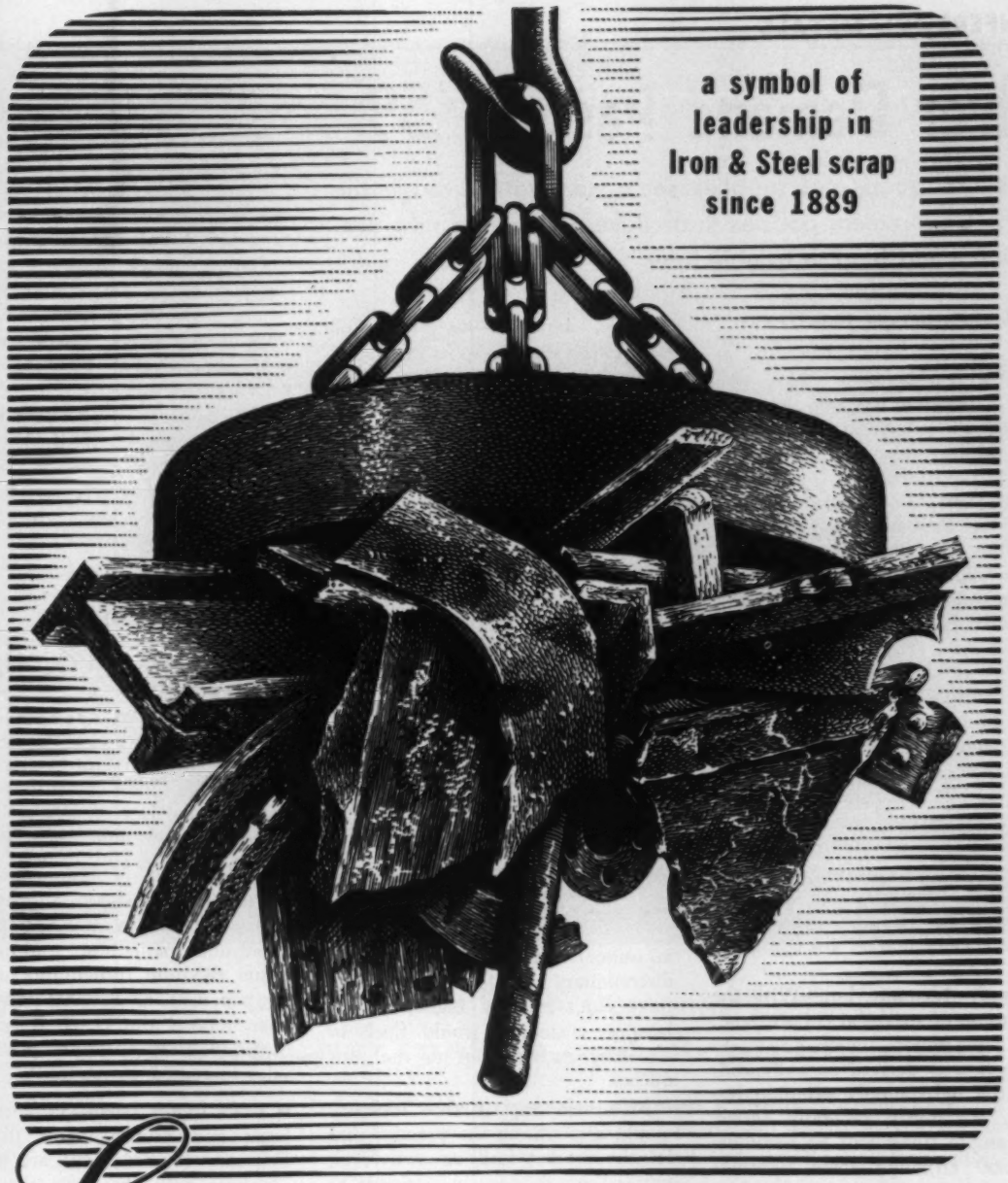
| | |
|---|---|
| No. 1 heavy melting | 32.25 |
| No. 2 heavy melting | 28.25 |
| No. 1 bundles | 32.25 |
| No. 2 bundles | 24.00 |
| Mixed steel scrap | 24.25 |
| Mixed borings, turnings | 13.00 |
| Busheling, new factory: | |
| Prepared | 32.25 |
| Unprepared | 26.25 |
| Shovel turnings | 17.00 |

Cast Iron Grades‡

| | |
|---|---|
| No. 1 machinery cast | 46.50-48.00 |

†Nominal.

‡F.o.b. Hamilton, Ont.




# *Luria Brothers and Company, Inc.*

MAIN OFFICE

**CHRYSLER BUILDING EAST**

New York, N. Y.

PLANTS

READING, PENNA. MODENA, PENNA.

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| | | |
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IMPORT and EXPORT — **LIVINGSTON & SOUTHARD, INC.**, Chrysler Building East, New York, N.Y. • 5950 S. Boyle Avenue, Los Angeles 58, California
*Cable Address:* FORENTRACO

# Silver Demand Passing '59

**Sales are good and supplies seem adequate through the year. Government policies that choke off needed new production could lead to trouble later**

Nonferrous Metal Prices, Pages 136 & 137

THE Soaring Sixties have so far lived up to promise for silver.

U. S. demand has run strong in the first quarter, leading to forecasts by producers and fabricators that 1960 will top 1959.

Last year, U. S. consumption of silver in the arts and industries leaped a whopping 18 per cent to 100 million ounces (another 40.7 million ounces went into coinage), estimates Handy & Harman, New York.

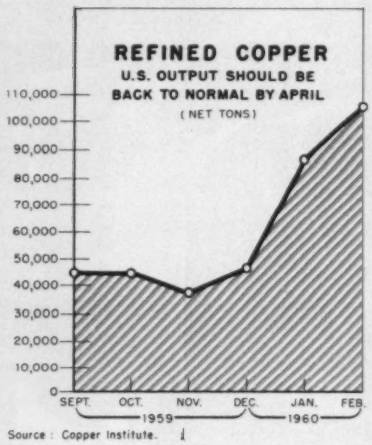
• **Steadily Climbing**—The world consumption graph line has been going steadily up in recent years thanks to new and expanded uses. For example, applications are booming in electrical and electronics goods. The metal joining market is growing. Demand from the chemical and photographic industries shows steady improvement. Sales to the jewelry market are rising.

• **Supply Adequate, but**—With the conclusion of strikes at copper, lead, and zinc mines (much of world production is derived as a byproduct) the tight supply situation has eased. It's pretty generally agreed that ample silver will be available in 1960 although some tightness may show late in the year.

Within five years, however, we will seriously need new silver production, believe marketmen. Here's why: For the last ten years, production has not been on a par with consumption. The rising level of world demand has been met by drawing on accumulated stocks.

• **Controlled Market**—Silvermen lay the major blame for shrinking output at the door of the U. S. Treasury Department. They contend: The U. S. does not operate on a free market basis but rather on one where the price is determined by the government.

Here's why: Treasury has the right to sell silver from its free stocks at a minimum price of 91 cents an ounce (adding freight, it would be delivered in New York from the San Francisco mint for 91.625 cents




Source : Copper Institute.

an ounce). Since it is exercising this discretionary right, it the producer price can't be any higher simply because customers would flock to Treasury rather than to the producers.

Metalmen say if the Treasury would discontinue the practice and let the market find its own level, mines that are now uneconomic to operate could be reopened and exploration for new facilities would be encouraged. They're afraid that under present policies U. S. Treasury stocks will soon be depleted (they've fallen from 211 million ounces to about 133 million ounces since last June) and, in the words of Simon Strauss, American Smelting & Refining Co. vice president, ". . . with the present trends of consumption and production, a sharp rise in the price of silver would ensue thereafter."

Too, overseas silver would be attracted to the U. S. if the price were higher here. Much of the foreign silver is going to Europe and Japan because of the higher prices prevailing in those areas.

## Market Memos

• **Aluminum Up**—The primary aluminum industry continues to run ahead of the record 1959 pace. February production of 156,826 tons was the best in history for that month. The industry is operating at an annual rate of 2,008,500 tons compared with total 1959 production of 1,953,019 tons.

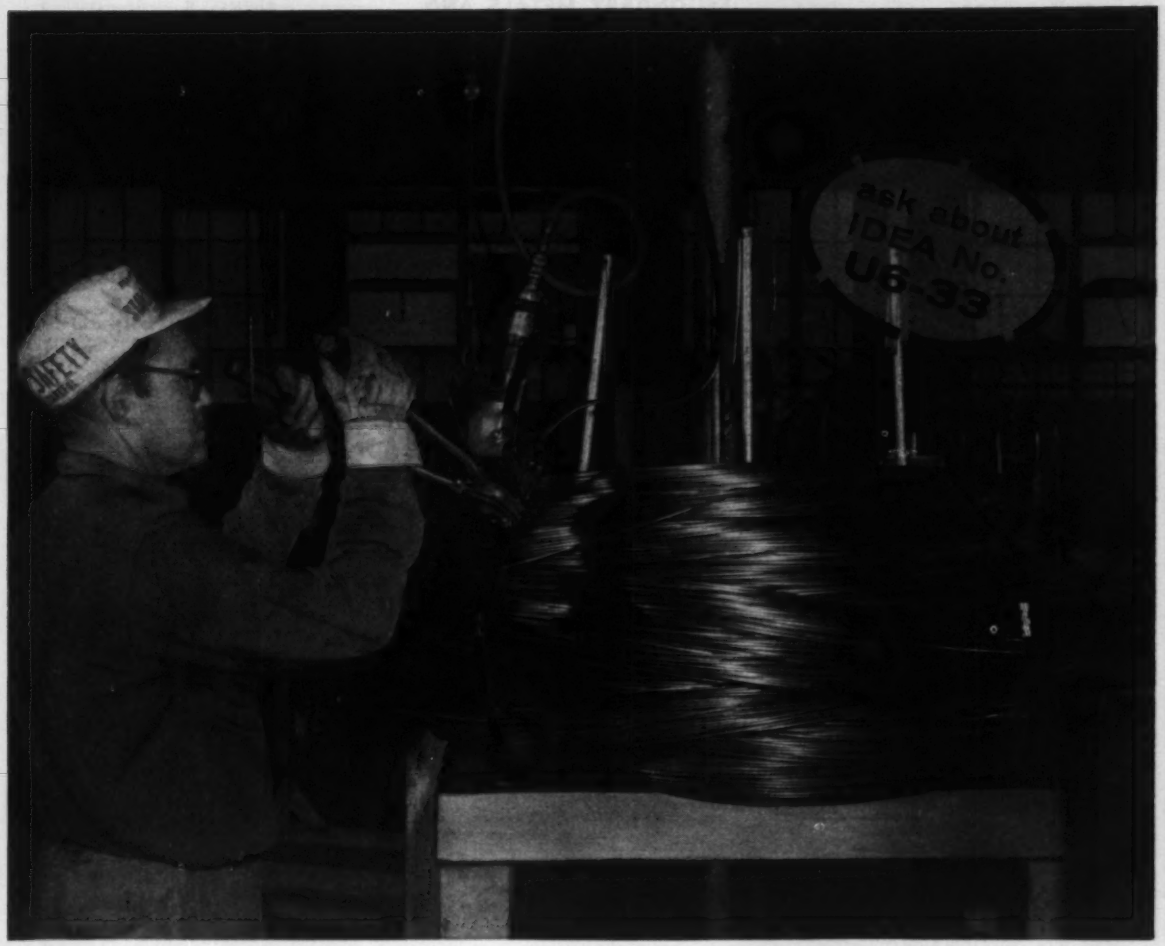
• **Platinum Gains**—U. S. consumption of the platinum group metals (platinum, palladium, iridium, osmium, rhodium, ruthenium) jumped 37 per cent to 850,000 tons last year, reports the U. S. Bureau of Mines. Biggest gainer was platinum; sales increased 46 per cent.

• **Brass Ingots Even**—Shipments of brass and bronze ingots through February (45,824 tons) are almost identical with those for the same period of 1959 (45,792 tons).

### NONFERROUS PRICE RECORD

| | Mar. 23 Price | Last Change | Previous Price | Feb. Avg | Jan. Avg | Mar., 1959 Avg |
|---|---|---|---|---|---|---|
| Aluminum | 26.00 | Dec. 17, 1959 | 24.70 | 26.000 | 26.000 | 24.700 |
| Copper | 33.00 | Mar. 10, 1960 | 33.00-35.00 | 34.000 | 34.000 | 32.031 |
| Lead | 11.80 | Dec. 21, 1959 | 12.30 | 11.800 | 11.800 | 11.238 |
| Magnesium | 35.25 | Aug. 13, 1956 | 33.75 | 35.250 | 35.250 | 35.250 |
| Nickel | 74.00 | Dec. 6, 1956 | 64.50 | 74.000 | 74.000 | 74.000 |
| Tin | 99.75 | Mar. 23, 1960 | 99.875 | 101.170 | 99.875 | 103.000 |
| Zinc | 13.00 | Jan. 8, 1960 | 12.50 | 13.000 | 12.917 | 11.000 |

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.




Work with your AIM*. . . Wire Sales Company does . . .

## Powered Stretcher makes coil strapping easier

Acme Idea Man Gene Fairbank helps many companies set up better, more economical packaging and material handling.

**WIRE SALES COMPANY, CHICAGO, ILLINOIS,** sought to develop a faster, easier method of strapping heavy coils of wire. Their Acme Idea Man recommended an Acme Steel B1P Pneumatic Stretcher for use with heavy-duty steel strapping. (Idea No. U6-33)

Result: each and every strap applied is of the same, uniform tension. This user feels that this is the most practical way of tieing large coils of wire weighing 2000 to 2300 lbs. each. The pneumatic-powered B1P can be set to deliver a pre-determined tension that pulls bundles to exactly the tightness and compactness desired. It eliminates operator fatigue as a reason for loose strap ties.

***Work with your Acme Idea Man** to improve your packaging and handling problems. Write Dept. SDU-30, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Limited, 743 Warden Avenue, Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

# Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

## PRIMARY METALS AND ALLOYS

**Aluminum:** 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

**Aluminum Alloy:** No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

**Antimony:** R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

**Beryllium:** 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

**Beryllium Aluminum:** 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

**Beryllium Copper:** 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

**Bismuth:** $2.25 per lb, ton lots.

**Cadmium:** Sticks and bars, $1.50 per lb deld.

**Cobalt:** 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

**Columbium:** Powder, $55-85 per lb nom.

**Copper:** Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

**Germanium:** First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

**Gold:** U. S. Treasury, $35 per oz.

**Indium:** 99.9%, $2.25 per troy oz.

**Iridium:** $75-80 per troy oz nom.

**Lead:** Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

**Lithium:** 1 lb or 2 lb ingots, less than 50 lb, $11 per lb f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

**Magnesium:** Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

**Magnesium Alloy:** AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

**Mercury:** Open market, spot, New York, $213-215 per 75 lb flask.

**Molybdenum:** Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

**Nickel:** Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

**Osmium:** $70-90 per troy oz nom.

**Palladium:** $24-26 per troy oz.

**Platinum:** $82-85 per troy oz from refineries.

**Radium:** $16-21.50 per mg radium content, depending on quantity.

**Rhodium:** $137-140 per troy oz.

**Ruthenium:** $55-60 per troy oz.

**Selenium:** $7 per lb, commercial grade.

**Silver:** Open market, 91.375 per troy oz.

**Sodium:** Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

**Tantalum:** Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

**Tellurium:** $3.00 per lb.

**Thallium:** $7.50 per lb.

**Tin:** Straits, N. Y., spot and prompt, 99.75.

**Titanium:** Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

**Tungsten:** Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

**Zinc:** Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb., New York basis, add 0.50. High grade, 14.25; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

**Zirconium:** Reactor grade sponge, 100 lb or less, $5 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

## SECONDARY METALS AND ALLOYS

**Aluminum Ingot:** Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 25.50-25.75; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 27.75-28.75; 108 alloy, 25.25-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

**Brass Ingot:** Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

**Magnesium Alloy Ingot:** AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

## NONFERROUS PRODUCTS

### BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

### COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

### LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

### TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

### ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

### ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

### NICKEL, MONEL, INCONEL

| | "A" Nickel | Monel | Inconel |
|---|---|---|---|
| Sheets, C.R. | 138 | 120 | 138 |
| Strip, C.R. | 124 | 108 | 138 |
| Plate, H.R. | 130 | 110 | 126 |
| Rod, Shapes, H.R. | 107 | 89 | 109 |
| Seamless Tubes | 157 | 129 | 200 |

### ALUMINUM

(Selected products and sizes)

**Flat Sheets:** 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

| Thickness Range (in.) | Widths (in.) | Length Range (in.) | Price Range |
|---|---|---|---|
| 0.250-0.136 | 24-72 | 72-180 | 45.10-47.70 |
| 0.136-0.096 | 24-72 | 72-180 | 45.50-48.70 |
| 0.096-0.077 | 24-72 | 72-180 | 46.20-50.00 |
| 0.077-0.068 | 24-72 | 72-180 | 46.70-51.70 |
| 0.068-0.061 | 24-72 | 72-180 | 46.70-55.50 |
| 0.061-0.048 | 24-72 | 72-180 | 47.30-57.30 |
| 0.048-0.038 | 24-72 | 72-180 | 47.80-60.20 |
| 0.038-0.030 | 24-72 | 72-180 | 48.20-65.30 |
| 0.030-0.024 | 24-60 | 72-180 | 48.70-56.60 |
| 0.024-0.019 | 24-60 | 72-180 | 49.40-59.90 |
| 0.019-0.017 | 24-48 | 72-144 | 50.30-57.00 |
| 0.017-0.015 | 24-48 | 72-144 | 51.20-58.00 |
| 0.015-0.014 | 24-36 | 72-144 | 52.30 |
| 0.014-0.012 | 24-36 | 72-144 | 53.50 |
| 0.012-0.011 | 24-36 | 72-144 | 54.60 |
| 0.011-0.0095 | 24-36 | 72-144 | 56.20 |
| 0.0095-0.0085 | 24-36 | 72-96 | 57.50 |
| 0.0085-0.0075 | 24-36 | 72-96 | 59.20 |
| 0.0075-0.007 | 24-36 | 72-96 | 60.80 |
| 0.007-0.006 | 24-36 | 72-96 | 62.50 |

### ALUMINUM (continued)

**Plates and Circles:** Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

| Alloy | Plate Base | Circle Base |
|---|---|---|
| 1100-F, 3003-F | 44.60 | 49.40 |
| 5050-F | 45.70 | 50.50 |
| 3004-F | 46.70 | 52.40 |
| 5052-F | 47.30 | 53.10 |
| 6061-T6 | 47.80 | 53.90 |
| 2024-T4 | 51.80 | 58.90 |
| 7075-T6* | 60.50 | 67.90 |

*24-48 in. width or diam., 72-180 in lengths.

**Screw Machine Stock:** 30,000 lb base, 12 ft lengths.

| Diam. (in.)* | Round 2011-T3 | Round 2017-T4 | Hexagonal 2011-T3 | Hexagonal 2017-T4 |
|---|---|---|---|---|
| 0.125 | 72.90 | 75.80 | .... | .... |
| 0.188 | .... | .... | .... | 78.20 |
| 0.250 | 58.00 | 61.60 | 70.70 | 72.30 |
| 0.375 | 57.20 | 62.40 | 69.00 | 70.50 |
| | 2011-T3 | 2017-T451 | 2011-T3 | 2017-T451 |
| 0.500 | 57.20 | 62.40 | 69.00 | 70.50 |
| 0.625 | 57.20 | 62.40 | 65.80 | 66.60 |
| 0.750 | 55.70 | 60.70 | 59.60 | 62.60 |
| 0.875 | 55.70 | 60.70 | 59.60 | 62.60 |
| 1.000 | 55.70 | 60.70 | 59.60 | 62.60 |
| 1.125 | 53.30 | 58.30 | 57.50 | 60.40 |
| 1.250 | 53.30 | 58.30 | 57.50 | 60.40 |
| 1.375 | 53.30 | 58.30 | 57.50 | 60.40 |
| 1.500 | 53.30 | 58.30 | 57.50 | 60.40 |
| 1.625 | 51.00 | 55.60 | .... | 58.20 |
| 1.750 | 51.00 | 55.60 | 56.30 | 58.20 |
| 1.875 | 51.00 | 55.60 | .... | 58.20 |
| 2.000 | 51.00 | 55.60 | 56.30 | 58.20 |
| 2.250 | 49.50 | 54.00 | .... | 58.20 |
| 2.500 | 49.50 | 54.00 | .... | 58.20 |
| 2.750 | 47.90 | 52.20 | .... | 58.20 |
| 3.000 | 47.90 | 52.20 | .... | 58.20 |
| 3.250 | .... | 52.20 | .... | .... |
| 3.375 | .... | 52.20 | .... | .... |

*Selected sizes.

**Forging Stock:** Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

**Pipe:** ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

**Extruded Solid Shapes:**

| Factor | Alloy 6063-T5 | Alloy 6062-T6 |
|---|---|---|
| 1-14 | 44.70-46.20 | 53.20-59.00 |
| 15-17 | 44.70-46.20 | 55.60-60.80 |
| 18-23 | 45.20-46.80 | 57.70-66.40 |
| 24-32 | 45.20-46.80 | 65.60-78.80 |
| 33-38 | 48.80-51.40 | 82.30-93.40 |
| 39-44 | 58.70-62.40 | 99.90-121.00 |

### MAGNESIUM

**Sheets and Plate:** AZ31B standard grade, .032 in., 103.10; .061 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .061 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

**Extruded Solid Shapes:**

| Factor | Com. Grade (AZ31C) | Spec. Grade (AZ31B) |
|---|---|---|
| 6-8 | 65.30-67.60 | 84.60-87.40 |
| 12-14 | 65.30-67.60 | 85.70-88.00 |
| 24-26 | 66.10-68.40 | 90.60-91.30 |
| 36-38 | 71.50-75.30 | 104.20-105.30 |

## NONFERROUS SCRAP

### DEALERS' BUYING PRICES

**Copper and Brass:** No. 1 heavy copper and wire, 23.25-23.50; No. 2 heavy copper and wire, 20.50-20.75; light copper, 18.00-18.25; No. 1 composition red brass, 16.00-16.50; No. 1 com-

## BRASS MILL PRICES

| | MILL PRODUCTS a | | | | SCRAP ALLOWANCES e (Based on copper at 33.00c) | | |
|---|---|---|---|---|---|---|---|
| | Sheets, Strip, Plate | Rod | Wire | Seamless Tubes | Clean Heavy | Rod Ends | Clean Turnings |
| Copper | 57.13b | 54.86c | .... | 58.32 | 29.000 | 29.000 | 28.250 |
| Yellow Brass | 50.57 | 36.06d | 50.86 | 54.23 | 22.250 | 21.250 | 20.250 |
| Low Brass, 80% | 53.53 | 53.22 | 53.82 | 57.09 | 24.750 | 24.500 | 24.000 |
| Red Brass, 85% | 54.58 | 54.27 | 54.87 | 58.14 | 25.750 | 25.500 | 25.000 |
| Com. Bronze, 90% | 56.17 | 55.86 | 56.46 | 59.48 | 26.750 | 26.500 | 26.000 |
| Manganese Bronze | 58.86 | 52.21 | 62.69 | .... | 20.875 | 20.625 | 19.875 |
| Muntz Metal | 53.20 | 48.26 | .... | .... | 20.875 | 20.625 | 20.125 |
| Naval Brass | 55.12 | 48.68 | 61.43 | 58.78 | 20.750 | 20.500 | 20.000 |
| Silicon Bronze | 62.86 | 61.80 | 62.15 | 80.79 | 28.375 | 28.125 | 27.375 |
| Nickel Silver, 10% | 65.98 | 68.06 | 68.06 | .... | 26.875 | 26.625 | 14.937 |
| Phos. Bronze | 77.44 | 78.19 | 77.69 | 79.37 | 29.875 | 29.625 | 28.625 |

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.00-15.50; new brass clippings, 14.50-15.00; light brass, 10.50-11.00; heavy yellow brass, 11.50-12.00; new brass rod ends, 12.00-12.25; auto radiators, unsweated, 12.50-13.00; cocks and faucets, 13.00-13.50; brass pipe, 13.00-13.50.

**Lead:** Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.00-9.50.

**Monel:** Clippings, 27.00-28.00; old sheets, 23.00-24.00; turnings, 20.00-22.00; rods, 27.00-28.00.

**Nickel:** Sheets and clips, 53.00-54.00; rolled anodes, 53.00-54.00; turnings, 41.00-42.00; rod ends, 53.00-54.00.

**Zinc:** Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.25-2.75.

**Aluminum:** Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 15.00-15.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

**Aluminum:** Old castings and sheets, 12.50-13.00; clean borings and turnings, 9.00-9.50; segregated low copper clips, 16.50-17.00; segregated high copper clips, 15.50-16.00; mixed low copper clips, 15.50-16.00; mixed high copper clips, 15.00-15.50.

(Cents per pound, Cleveland)

**Aluminum:** Old castings and sheets, 11.75-12.00; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.50-15.00; mixed low copper clips, 15.00-15.50; mixed high copper clips, 14.00-14.50.

### REFINERS' BUYING PRICES

(Cents per pound, carlots, delivery refinery)
**Beryllium Copper:** Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

**Copper and Brass:** No. 1 heavy copper and wire, 26.75; No. 2 heavy copper and wire, 24.25; light copper, 22.00; refinery brass (60% copper) dry copper content, 21.50-21.75.

### INGOTMAKERS' BUYING PRICES

**Copper and Brass:** No. 1 heavy copper and wire, 26.75; No. 2 heavy copper and wire, 24.25; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.25; yellow brass turnings, 14.25; radiators, 16.25.

## PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

### ANODES

**Cadmium:** Special or patented shapes, $1.50.

**Copper:** Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.00; 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

**Nickel:** Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

**Tin:** Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

**Zinc:** Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

### CHEMICALS

**Cadmium Oxide:** $1.40 per lb in 100-lb drums.

**Chromic Acid (flake):** 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

**Copper Cyanide:** 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

**Copper Sulphate:** 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

**Nickel Chloride:** 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

**Nickel Sulphate:** 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

**Sodium Cyanide (Cyanobrik):** 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

**Sodium Stannate:** Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

**Stannous Chloride (Anhydrous):** 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

**Stannous Sulphate:** Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

**Zinc Cyanide:** 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 131*)

April industrial lists are expected to develop a little stronger market.

• **St. Louis**—Prices are holding despite the sluggish demand. The mills are showing a little more interest in buying. At the same time, only a minimum amount of material is coming into the market because of bad weather and low prices.

• **Birmingham**—Brokers continue to quote prices as nominal in the absence of representative buying. Strikes at nine large soil pipe plants continue, but cast iron pipe manufacturers are expected to enter the scrap market soon.

• **Houston**—Prices are expected to hold present levels until midyear. The Houston mill issued new quotations early this month and they will remain in effect through April. A mill spokesman thinks the market may be on bottom, but he sees no early upturn, indicating his mill would pursue a policy of building inventories so long as present price levels hold.

• **San Francisco**—Prices may be on bottom, but the mills are not pushing purchases to provide a test, even though a buyer's market prevails.

• **Los Angeles**—The market here is soft, with demand virtually absent. Prices are low, with cast iron No. 1 cupola down to $43, and expected to fall to $40 in the next week or two.

• **Portland, Oreg.**—The market here continues weak. There is little buying interest, with large consumers holding heavy stocks. Prices are down $2 from a week ago; No. 1 heavy melting is being quoted at $34, and No. 2 heavy melting $32. Other grades are off correspondingly.

A local exporter dispatched a full cargo of 9300 tons to Japan last week and plans a repeat shipment in April. Japanese buyers are negotiating for lower prices, meanwhile delaying placement of additional new business.

• **Seattle**—Reduced steelmaking operations and large inventories at consumers' plants, are causing a further easing in prices here. The list is off $1 to $2.

## Inventories of Scrap Drop in January

Estimated consumption of purchased iron and steel scrap in January declined from the December level but was well ahead of that in January, 1959, reports the Institute of Scrap Iron & Steel Inc. The total for the month was 2,781,000 gross tons vs. 3,092,000 in December and 2,088,000 a year ago.

Total home and purchased scrap consumption during the month was 7,040,000 tons, a new monthly record and slightly larger than the December level.

Purchased scrap receipts of 2,613,000 tons were about 500,000 tons below December's but 600,000 tons ahead of the January, 1959, figure.

Consumers' inventories declined 420,000 tons in the month to 8,939,480 tons from the record 5,518,000 tons held at the end of December. The drop was the largest since January-February, 1951.


## CLASSIFIED

**MECHANICAL ENGINEER**

Tubing manufacturing and fabrication. Excellent opportunity. Send full particulars to Box 843, STEEL, Penton Bldg., Cleveland 13, Ohio.

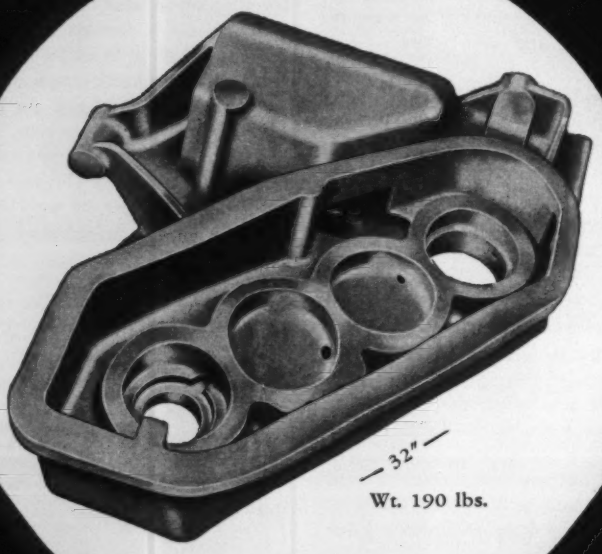
**Help Wanted**

**PLANT SUPT. WANTED**
Steel fabricating plant wants superintendent capable of complete charge of active 1,000-ton shop. Company has excellent reputation, AAA-1 rating, 50 years experience. Location: Southwest, in city of 100,000, good recreational facilities and schools. Prefer man 35-45 years of age. Expect applicant to schedule work, control foremen, and have knowledge of all fab tools. Include record of experience, educational training, salary expected. Address Box 841, STEEL, Penton Bldg., Cleveland 13, Ohio.

**METALLURGISTS — MET. ENGINEERS — CHEMICAL ENGINEERS.** Present expansion program in both research and production provides openings for above individuals with experience in one or more of the following: electric furnace operation—either open or submerged arc; smelting, melting and refining operations in either ferroalloys or steel. Excellent opportunities for professional growth and advancement. Generous benefits. Salaries open. All replies held in strictest confidence. Send complete resume to: Mr. R. T. Howard, Technical Director, Chromium Mining and Smelting Corporation, 13550 So. Indiana Ave., Chicago 27, Ill.

**PLANT ENGINEER**
Experienced in layout of equipment, material handling and material flows. Foundry background preferred. Position offers variety of work, excellent starting salary, profit sharing and other benefits. Send complete details on work history, education and family status. Include recent photograph. All replies will be held in confidence. Write Box 842, STEEL, Penton Bldg., Cleveland 13, Ohio.

# URICK'S URITE GRAY IRON




*Courtesy Euclid Division General Motors, Cleveland*

GEARED TO THE JOB

URICK Foundry's integrated sales and engineering departments are geared directly to the production department —all working together to supply high quality gray iron castings with dimensional stability, uniform density, and high machinability.

From the planning stage, all the way to the finished part, URITE gray iron castings are designed and engineered to deliver greater tensile strength in relation to the service required, and in many cases with less weight. URITE gray iron is better because it is cast with fine flake graphite uniformly distributed throughout the iron matrix.

URICK'S modern facilities, manned by a competent co-operative team, produces quantities of high grade castings to meet the most demanding schedules.

*Contact URICK, the foundry that starts with "U" and stays with you. Write for advanced technical data about URITE gray iron castings.*

URITE CASTINGS URICK FOUNDRY

DEPT. S-2 ERIE, PENNSYLVANIA


## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

9500 tons, low alloy and carbon, about 6500 and 3000 tons, respectively, superstructure, Frazer River highway bridge, British Columbia, to Dominion Bridge Co., Vancouver, B. C., at $6,894,287 by the Department of Highways, Victoria, B. C.

3400 tons, three missile launching sites near Mountain Home, Idaho, to Isaacson Iron Works, Seattle.

2850 tons, highway structures, Shreveport Expressway, Caddo Parish, La., to Orleans Materials & Equipment Co., New Orleans; Nichols-Southern Div., Yuba Consolidated Industries, Baton Rouge, La., general contractor.

1900 tons, St. Paul bridge section, Jones Falls Expressway, Baltimore, to Phoenix Bridge Co., Phoenixville, Pa.; McLean Contracting Co., Baltimore, general contractor.

950 tons, five state highway bridges, Hanover-Norwell-Rockland-Hingham, Mass., to American Bridge Div., U. S. Steel Corp., Pittsburgh; J. G. White Contracting Co., Westwood, Mass., general contractor.

670 tons, St. Francis Infirmary Retirement Home for Sisters of St. Francis, Joliet, Ill., to Vierling Steel Works, Chicago.

579 tons, high tensile, amphibious transport dock, Navy Purchasing Office, Washington, to Bethlehem Steel Co., Bethlehem, Pa.

380 tons, including joists, regional high school, No. 10, Burlington, Conn., to National Steel Fabricators, Hartford, Conn.; A. F. Peaslee Inc., Hartford, general contractor; reinforcing to Scherer Steel Co., East Hartford, Conn.

### STRUCTURAL STEEL PENDING

3500 tons, Bureau of Reclamation, transmission tower project in South Dakota; bids Mar. 29, schedule No. DC-5275.

413 tons, Basin Road Interchange, New Castle County, Delaware, bids close Apr. 13 by the State Highway Department; also, 277 tons of reinforcing bars required.

150 tons, two state highway bridges, North Haven, Conn.; bids Mar. 28, Hartford, Conn.; also, 365 tons of steel piling, 100 tons of reinforcing bars, and 55 tons of sheet piling.

151 tons, high and medium tensile, Navy Purchasing Office, Washington; bids Mar. 20.

100 tons or more, addition to state penitentiary, Walla Walla, Wash.; Arrow Iron & Machine Works, Seattle, low at $27,465.

## RAILS, CARS . . .

### LOCOMOTIVES PLACED

Duluth, Missabe & Iron Range, thirteen, 1800 hp locomotives, to Electro-Motive Div., General Motors Corp., La Grange, Ill.

National Railways of Colombia, seven 700-hp diesel electric locomotives, to the International General Electric Co., Erie, Pa.

### RAILROAD CARS PLACED

Southern Pacific, 400 gondolas, to Magor Car Corp., New York.

Boston & Maine, 20 caboose cars, International Car Corp., Buffalo.

Central of Georgia, 100 covered hopper cars, to the Pullman-Standard Div., Pullman Inc., Chicago.

Union Pacific, 200 seventy-ton gondolas, to Gunderson Bros., Engineering Corp., Portland, Oreg.

Canadian Pacific, 300 seventy-ton flatcars, to Dominion Steel & Car Corp., Trenton, Nova Scotia.

U. S. Department of Interior, 25 helium cars, to ACF Industries Inc., New York.

North American Car Corp., 80 seventy-ton piggyback flatcars, to American Car & Foundry Div., ACF Industries Inc., New York.

Long Island Railroad, six caboose cars, to International Car Div., Morriston-International Corp., Buffalo.

Western Pacific, 264 freight cars placed, 200 seventy-ton insulated boxcars going to the Pacific Car & Foundry Co., Renton, Wash., 50 seventy-ton flatcars to the Thrall Car Mfg. Co., Indianapolis, 10 seventy-ton covered hoppercars to the American Car & Foundry Div., ACF Industries Inc., New York, and four seventy-ton covered hoppercars to the General American Transportation Corp., Chicago.

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TO FIND THE MAN YOU NEED . . .

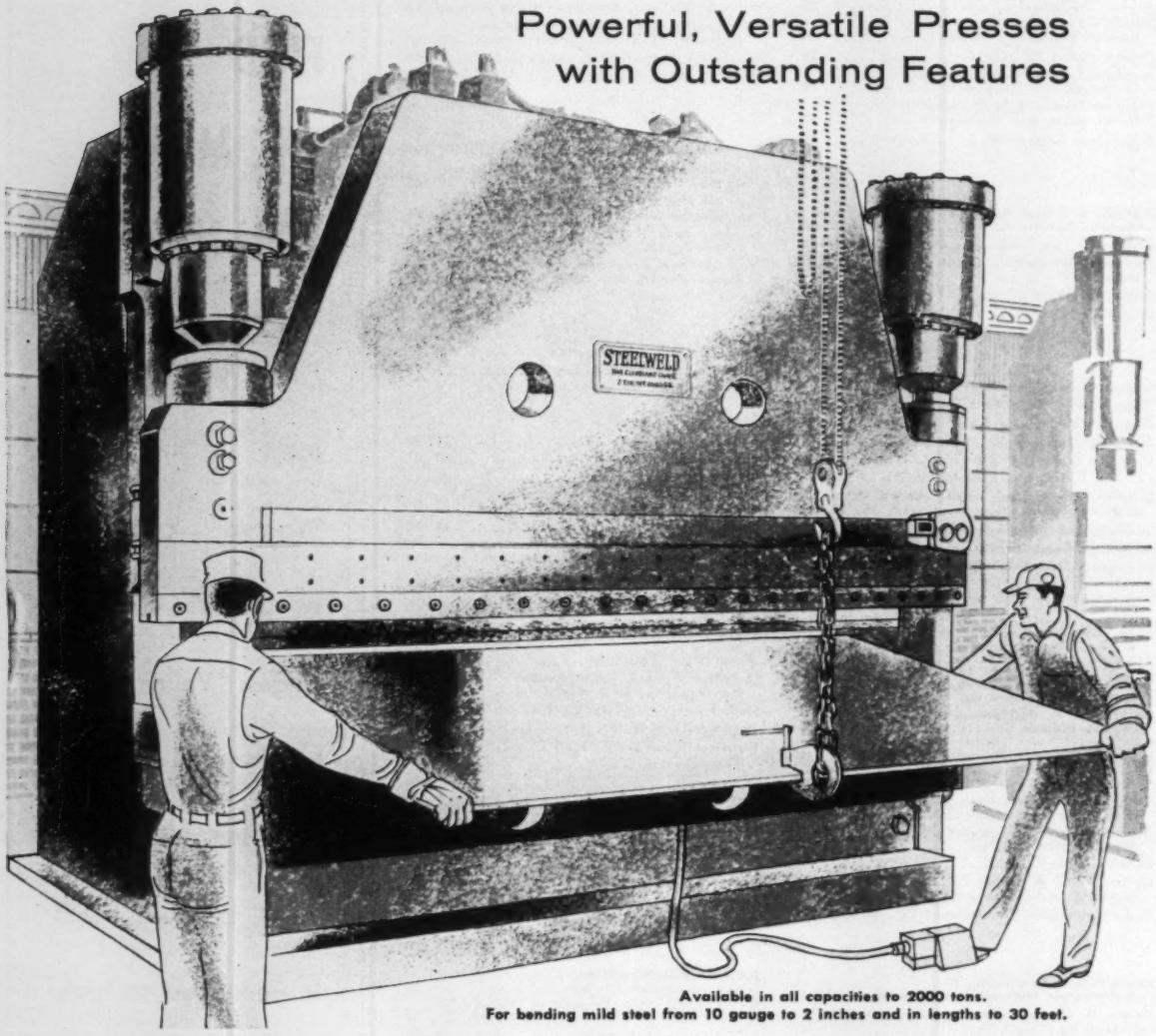
Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking

STEEL
The Metalworking Weekly

# STEELWELD

## HYDRAULIC PRESS BRAKES

### Powerful, Versatile Presses with Outstanding Features




**Available in all capacities to 2000 tons.**
**For bending mild steel from 10 gauge to 2 inches and in lengths to 30 feet.**

- **Positive overload protection.**
- **Constant power during entire stroke.**
- **Ram reversible at any point.**
- **Stroke quickly adjusted for any length.**
- **Fast ram approach and return—slow-speed pressing.**
- **Operating pressure simply adjusted.**
- **Accurate ram level automatically maintained.**
- **Ram easily tapered.**
- **Simple, safe to operate.**

HEAVILY built and of finest quality throughout, Steelweld Hydraulic Press Brakes are of the most advanced design with all features desirable for ease of operation, maximum production and finest performance.

They are versatile machines capable of handling a wide variety of operations. They are ideal for jobbing shops, as well as for mass-production work. They work to close tolerances and have ample speed.

We urge you to get the facts on these outstanding brakes that have so much to offer you.

*Write for free copy of catalog No. 2024A.*

**STEELWELD**

**HYDRAULIC PRESS BRAKES**

Other Steelweld Machinery:
Hydraulic Shears; Mechanical Shears and Press Brakes; One-Two- and Four-point Straight-Side Presses; Hi-Draw Presses.

THE CLEVELAND CRANE & ENGINEERING COMPANY · 7871 EAST 281st STREET · WICKLIFFE, OHIO

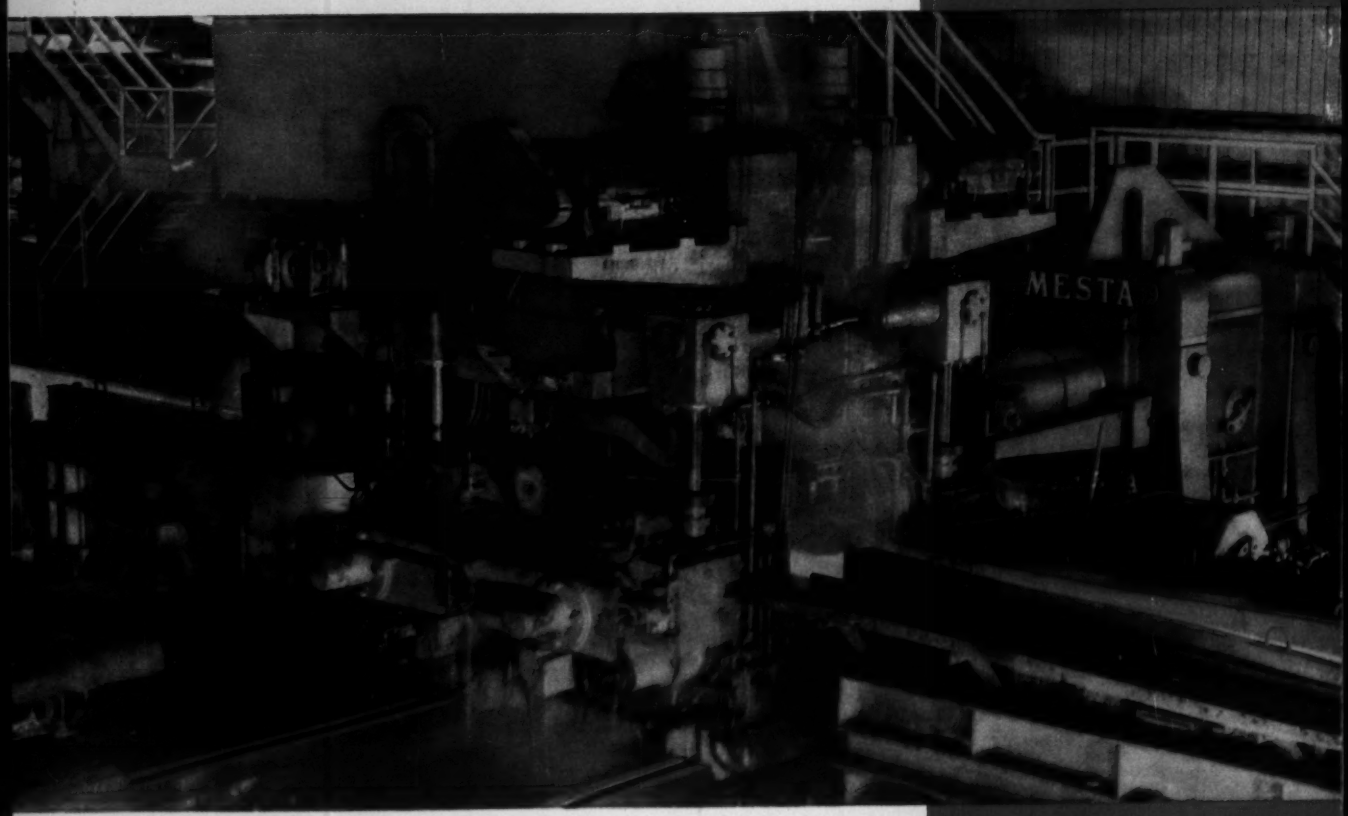
**Think what you can do with an open coil.** Lee Wilson engineers, ever searching for better ways to anneal metal, scored an important breakthrough by devising a workable method for opening and handling large coils of steel. This has proved to be the most effective way to anneal yet discovered. But there's more—already several steel engineers have considered the open coil system the ideal station for oiling, cleaning, coating and other surface treatments in addition to annealing. Think what complete surface exposure means to your processing of sheet products, then contact Lee Wilson engineers for complete details and/or test coil arrangements.

Lee Wilson* ENGINEERING COMPANY, INC.

20005 LAKE ROAD • CLEVELAND 16, OHIO

HIGH PRODUCTION ANNEALING SYSTEMS MAKE THE BEST METALS BETTER

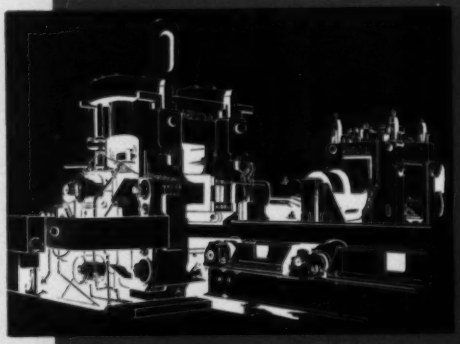
* ORIGINATORS AND LEADING PRODUCERS OF OPEN COIL AND SINGLE STACK FURNACES




Mesta Universal Structural Mill Rolling Wide Flange Beams on the 44" Universal Stand and the 34" Edging Stand at Inland Steel Company, Indiana Harbor Works

# WIDE FLANGE BEAM AND STRUCTURAL MILLS

Designed and Built by MESTA



*Designers and Builders of Complete Steel Plants*

**MESTA MACHINE COMPANY**

PITTSBURGH, PENNSYLVANIA